

# SURVIVAL GARDENING

*With Heirlooms*



**Growing Nutrient-Dense Foods  
When All Hell Breaks Loose**



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# **PART ONE:** **INTRODUCTION TO SEEDS**

## **INTRODUCTION**

### **Why you need the survival seed bank**

Chances are great that if you are reading this book you have already purchased the Survival Seed Bank. That means you have at least a partial understanding of why the seeds you are storing are so important for the future of your family. You may not currently have a full understanding of just how dire the world food situation is. You may not quite comprehend why non genetically modified seeds like those in the Survival Seed Bank could truly save the life of you and your family, if necessary. This is why you need these seeds:



Have you heard about the giant seed vault up in Norway? There are millions of seeds stored to supposedly “protect” the planet in case of a loss of genetic diversity. The seeds will supposedly be used to grow food in the event of a major catastrophe. The practical matter of fact is that the seeds in the seed bank are controlled by government agencies around the world and are unlikely to do anything to help individual families in the event of a massive world food shortage. Signs of a food shortage are already evident. You may think you can just run out and buy seeds from the hardware store to grow your own food if such a shortage happens.

That is simply not true. The reason: most of those seeds are hybrids or genetically modified seeds. You may be able to grow plenty of food for one year, but you won’t be able to save the seed for growing the next year. That is where the Survival Seed Bank comes in.

## No GMOs

The survival seed bank contains only open pollinated varieties of highly nutritious heirloom vegetable varieties. There are no genetically modified beasts here. While genetically modified and hybrid seed might produce more food in the short run, it takes laboratories full of highly trained technicians to perpetuate availability of seed from year to year. By only making hybrid seed available, seed companies are essentially holding regular families hostage—if you don't buy their products, you can't eat. Open pollinated seeds are different, and difficult to lay your hands on if you don't know where to look.

Not just any open pollinated or heirloom variety of seed will work. Because open pollinated seeds can cross with each other, unless they are farmed and harvested with care to keep certain varieties away from each other, the seeds can lose vigor from year to year. The Survival Seed Bank seeds are some of the strongest varieties you can use to grow a survival garden. This book will teach you how to grow these plants so that you can continue to harvest and save seeds that will be viable from year to year. That is why each aspect of this book is so important. The Survival Seed Bank will not only produce a year's supply of food for a family if given good care, it will continue to provide seeds for subsequent years when the seeds are planted and cared for according to instructions in this book.

## Frequently asked questions

As creators of the Survival Seed Bank, we are frequently asked several questions about storage and use of our seeds. You asked, so we answered.

**Q.** How long will the seeds in my survival seed bank last?

**A.** That depends entirely on where you store the seeds. Seeds are living things, and are affected by temperature and humidity. Our seeds are packaged in two layers of packaging designed to keep a stable moisture level inside the seed packs. If kept in an ordinary cool, dark place, these seeds could last for twenty years or so. If kept in a freezer with low humidity, they can keep for up to one hundred years.

**Q.** Why are heirloom seeds so hard to find commercially?

**A.** Around the end of World War II, conglomerate seed companies started promoting hybrid seeds. With industrial agriculture making small scale farming impractical for most families, home gardening and farming, along with food preserving and seed saving skills began to slip away. At that point, the large seed companies got the upper hand. Today, heirloom seeds and open pollinated varieties are only grown and harvested at a handful of locations by small farmers. More and more people are stockpiling heirloom seeds, which is decreasing the availability rapidly.

**Q.** How can I protect my survival seed bank from being taken?

**A.** The Survival Seed Bank is a self-contained unit that can be kept in the freezer when conditions allow, to prolong the life of seeds. If necessary, the container can be buried, as it is water-proof, and the seeds are double-vacuum sealed. To bury the seed bank, it has to be sealed with PVC cement, which can be purchased at any local hardware store.

## **How we selected our included seeds**

Building a seed bank that will feed a family in times of crises is no small order. Actually acquiring the seeds in a timely fashion so that people will have the seeds they need to plant a garden when they need a garden is even more difficult. When we set about gathering a profile of seeds that would help a family be self sufficient in times of world food shortages, we considered the following characteristics of the plants:

- ▶ Health benefits and nutrients provided
- ▶ Ease of growth for family food production
- ▶ Storage of the finished product
- ▶ Ease and reliability of harvesting seeds for perpetuating your seed bank

We are confident that with these instructions and the seeds carefully selected for the survival seed bank that even people with very little gardening experience can grow enough food to support their family if necessary.

## **You CAN do this!!**

What makes us so confident that people with no gardening experience can grow their own food? Well, people with no formal training grow beautiful gardens-some from the first time they put their shovel in the ground. Vegetables are not a lot different from other flowering plants because they are flowering plants. We think that, actually, if people who grow flowers for their hobby read this book they would grow nicer looking flowers. That is because when you know how a plant grows, you can better take care of it. When you know how to build the soil from materials already on hand, you can recycle what is on your land back into the land. It really is easier than some survival gardening books would lead you to believe. We'll show you how.

## CHAPTER ONE: THE PLANT LIFE CYCLE

### Parts of a Plant

In order to properly care for your plants, you need to know about the parts of the plant and the plant life cycle. This knowledge will help you do the right things to the right plant part so that you can harvest a bounty of vegetables and perpetuate your seed bank for the next year. Included below is a diagram of a plant, and a glossary of its basic parts.

### Plant Parts Glossary

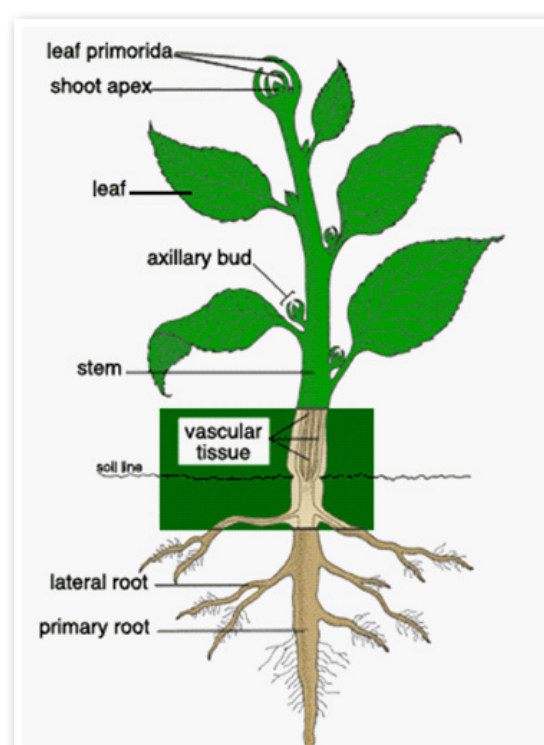
**Root** – The collective term for all of the (typically) below-ground parts of the plant.

**Primary Roots** – Largest roots of the plants. They serve as storage units for some plants, like potatoes. Plants that have large primary roots and few lateral roots are said to have a “taproot.” Dandelions have taproots, which is why they are so hard to uproot. Vegetables that are actually taproots are carrots, beets, parsnips and turnips.

**Lateral Roots** – Medium sized roots that lead from the root hairs to the primary roots. They are primarily conductors of fluids within the plants.

**Root Hairs**-Root hairs are where the real work of the roots is done. The root hairs soak up water and nutrients that are then transported to the lateral and primary roots. The root hairs are microscopic and easily disrupted. Their disruption can interfere with plant growth because the plant cannot take up the water and nutrients it needs.

The root hairs also help establish the water tension between the top of the leaves that are evaporating water and the bottom of the plant that is taking up water. This is called “capillary action.”





**Shoot** – the collective term for all above ground parts of the plant.

**Stem** – The structural support system and primary vertical water and sugar conducting part of the plant. The cells that move water and sugar up and down through the plants are called “vascular bundles.”

**Leaf** – The leaf is where photosynthesis to produce food occurs. The photosynthesis takes place in molecules called “chloroplasts” that absorb light.

**Flower** – The flower is the reproductive part of the plant. From the flower develops the seeds and, when applicable, the fruit.

**Fruit** – A fruit is the composition of material that contains all of the plant seeds. Tomatoes are fruits, as are acorns. Ears of corn are actually the fruit of the corn plant because they are derived from the reproductive part of the corn plant, the flowers (tassels).

**Axillary Bud** – These buds sprout from the intersection of the leaf with the stem. Sometimes, you will want to pinch off these buds so that the main plant grows larger.

**Apical Meristem** – The very top of the shoot where the plant grows. The apical meristem releases plant hormones that keep lateral buds from sprouting. If you want a more full, bushy plant, you will need to pinch off the apical meristem.

**Crown** – This is the area of the plant where the root meets the shoot. Generally, the crown is just above the soil line.

**Petiole** – The “leaf stem.” This is the part of the leaf that connects to the plant stem. The petiole carries water, nutrients and gas (carbon dioxide and oxygen) to and from the leaf.



## **Parts of the Plant: Food Plants**

Knowing which part of the plant you are eating, and therefore harvesting, will help you harvest the plant correctly.

**Roots** – These vegetables are roots or modified roots: potatoes, carrots, turnips, radishes, parsnips

**Stems** – These foods that you grow are the stems of the plant: rhubarb, ginger root, asparagus



**Leaves** – These foods that you grow are the leaves of the plant: spinach, swiss chard, lettuce, cabbage, kale, basil, sage, parsley, celery (The leaf stalk, or petiole is what makes up the “celery sticks” we eat), onions, leeks



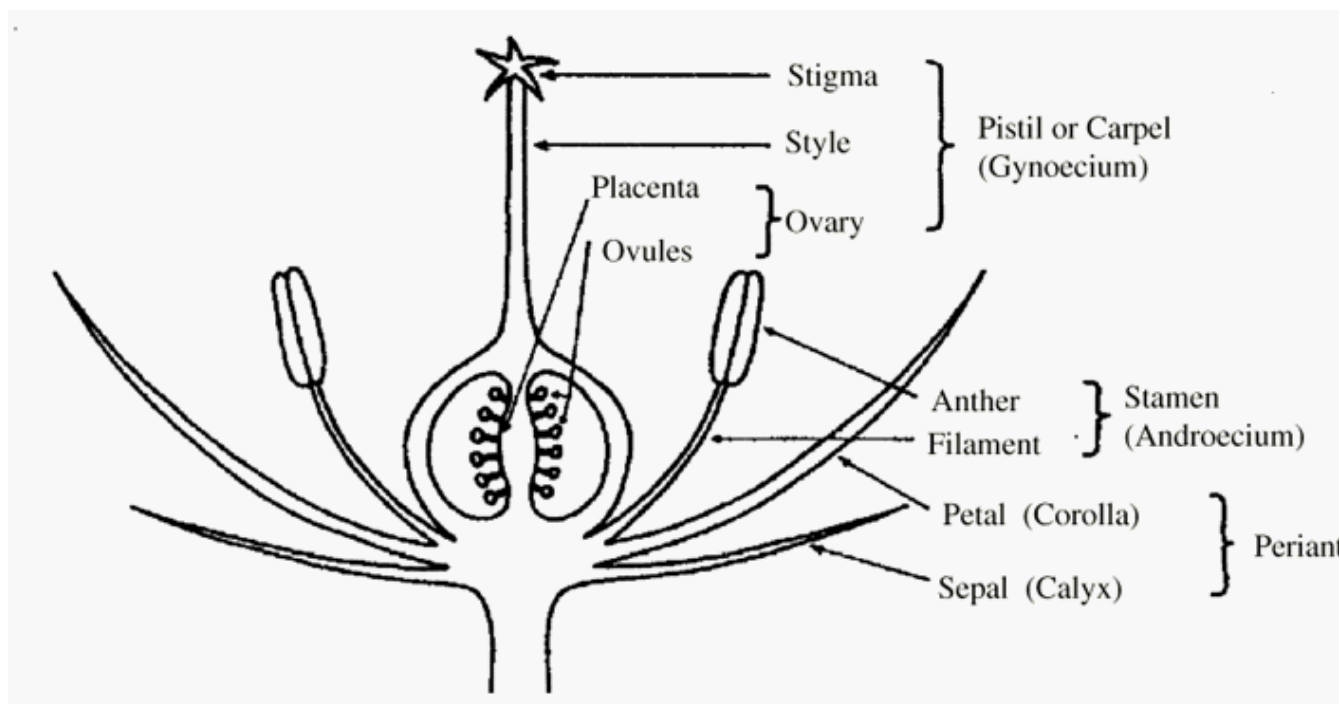
**Flowers** – These foods that you grow are actually the flowers of the plant: broccoli, cauliflower, artichoke



**Fruits** – These foods that you grow are the fruits of the plant: peppers, tomatoes, zucchini, summer squash, winter squash, corn, eggplant, cucumbers, melons, beans, strawberry, raspberry, blueberry

## Parts of Flowers

The flowers are the reproductive part of the plant. It is important to know the parts of a flower so that you can perpetuate your vegetable seed stash from year to year. All of the plants in your Survival Seed Bank will continue to produce viable seeds for many years, but some of the plants need to be grown in opposite corners of the garden because they can cross pollinate. Flowering plants are divided into two groups, dicots and monocots. This refers to the number of leaves within the seed, and seed leaves are called cotyledons. So, dicots have two seed leaves on the plant embryos within the seeds and monocots have one seed leaf. The flower parts are similar, but occur in different multiples as shown in the diagram below.



Within your seed pack, the only monocot plants are the corn seeds. Monocots are things like lilies, and grasses. Corn is basically domesticated grass. Below is a diagram of the parts of a flower. You can see that the ovary of the flower, when cut up and down, looks a lot like a tomato that has been cut from top to bottom, longitudinally. During pollination, pollen from one plant is transferred by wind, animals or water to the stigma of another plant, causing fertilization and reproduction. So-called “open pollinated” varieties will self-sustain without intervention.

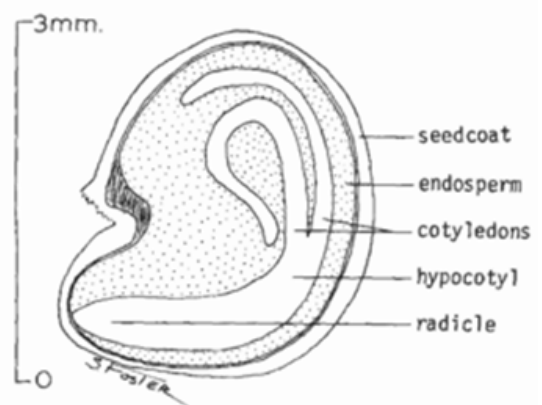
Hybrids result from the crossing of two very distinct varieties.

The resulting seeds have what is called “hybrid vigor,” meaning that they are uniform and robust, but you cannot get the same plants the next year if you save the seeds from the fruits of the plants that grow as a result of the hybrid seeds. Not so vigorous.

## **Parts of Seeds**

In addition to the parts of the flower, it is useful to know the parts of a seed and understand how the seed works. A seed has a baby plant inside it. That is the embryo. Seeds also have food stored inside them. When seeds are kept at optimum temperature and humidity conditions, they can last for years. The protective outer layer of the seed is called the seed coat. When a seed is given conditions favorable for growing, usually

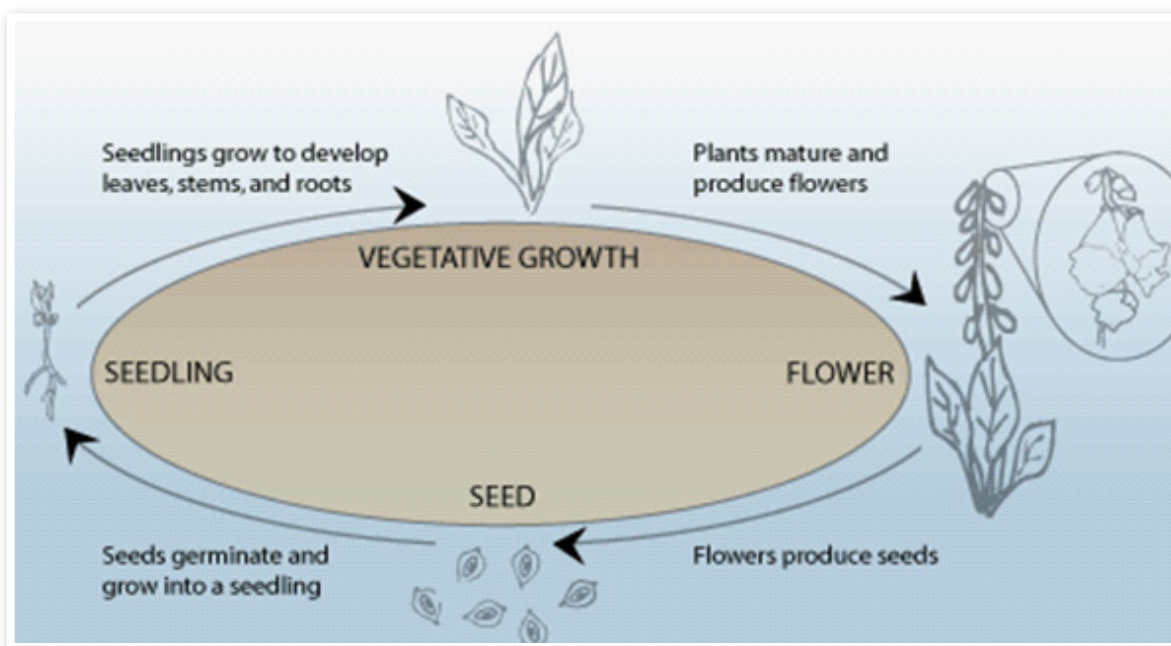
involving water, the embryo will begin growing, burst through the seed coat and begin setting down roots and pushing up a shoot. Some seeds require more than just water and soil to begin sprouting. They need to be nicked, burned or otherwise treated. Most of the seeds in the survival seed bank do not need special treatment in order to sprout, but the seed bank does come with a seed germination jump start solution that will begin breaking down the seed coat for faster sprouting.





## Plant Life Cycle

Basically, a seed sprouts and produces a plant that flowers and produces seeds, that then sprout. The cycle continues. Annual plants complete this entire life cycle within one season. Biennials take two years to complete their life cycle. A seed will sprout, the plant will grow leaves and store energy. Then, it will undergo a period of dormancy. After the period of dormancy, the plant will re-sprout, flower and produce seeds. Perennials are almost a combination of annuals and biennials. Perennial plants can sprout, flower and produce seeds in one year, but at the same time they are doing that, they are also storing energy to survive a dormant period to be able to re-sprout again. Most of your vegetable plants will be grown as annuals, though to save seed for the following year, you will grow some as biennials.



## **Plant Life Cycles and Harvest**

Each plant that you eat will be harvested at a different point during its life cycle. You can partially discern when by paying attention to which part of the plant you eat. For example, if you want to harvest large beets, you need to pull them up after they have had time to store lots of starches to grow a big root, but before they turn hard and leathery, preparing to overwinter to set seed the next year. You generally harvest a plant for eating at a different time than you would harvest it for seed-but not always. Pumpkins and other winter squash are harvested at the same time for eating and seed saving, as are beans.

That is because they are actually “fruits,” botanically speaking, and when the fruits are ripe, the seeds are too. Animals eating and “dispersing” the seeds is one mechanism by which these plants reproduce. Root and leaf vegetables are harvested at different times for eating and reproducing. Many root vegetables are biennials. They use the sugars stored over the winter in the root structure so that they may re-sprout and set seeds the following year.

If you want to eat them, you harvest during the first year. Because of the differences between each type of plant, part three of this book details how to grow, harvest and save seed from seed for each type of plant included in the Survival Seed Bank. If you need specific instructions for any single type of plant, refer to its section later in the book.

## CHAPTER TWO: SEED HARVESTING AND STORAGE



The seeds selected for the Survival Garden kit are all open-pollinated. That means that as long as you grow them, following instructions, you will be able to save seeds to plant the following season. Each plant has slightly different harvesting requirements, which will be detailed in the section about individual plants.

### **When to Harvest**

Harvesting for seed saving is different than harvesting for eating. Seeds are generally ready when the fruits are dry or ripe. Many beans are harvested when the pods are dry, whereas tomatoes are ready for harvesting when the fruit is ripe. It depends upon the dispersal mechanism of the seed. Seeds with fleshy fruits are generally dispersed by being eaten, and thus are ready to harvest when the fruit is ripe.

### **How to Harvest**

You ultimately want to prepare the seeds for storage. To do this, you must first harvest the seeds when they are ready and separate the seeds from other bits of dried material or from juicy flesh. If a plant produces seeds that dry on their own, you can collect seeds in the field, just using a bag. If you need to separate the seeds from the flesh of the fruit, pick the fruits and bring them inside, hand-picking the seeds from the fruits.

## How to Prepare for Storage

Seeds need to be completely free of any other material that is not the seed. In the case of dry beans, they need to be out of their pods. Tomato and melon seeds need to have all extra flesh removed from the seeds. Any extra dried material around the seed is called “chaff.” (Hence the saying “separate the wheat from the chaff.”) Removing this material is called “threshing.”

In order to store seeds in the freezer, where they will be most stable, you need to dry out the seeds to contain no more than 8% moisture. You can use silica gel to dry out the seeds. You can tell if a bean seed is dry enough if you smack it with a hammer and it shatters instead of mashes. To use the silica gel, put seeds in paper packets and put the packets in the silica gel beads. After about six days, check the seeds. To dry out the gel, use a microwave or follow the instructions for air-drying for re-use.

## Where to Store

Where you store your seeds will have the single greatest impact on how long they last. Ideally, you will freeze your seeds in a freezer that does not contain other food which could produce ethylene. If you freeze your seeds, you need to leave the container in which they are frozen out to come to room temperature before you open it so that condensation does not form on the seeds, which could cause them to mold or start to sprout.

Ideally, the temperature and humidity will add up to the number 100 when you add them together. For instance, if you store seeds at 40 degrees Fahrenheit, you want no more than 60% humidity. If possible, vacuum seal your seeds-sucking all air out of the package that holds the seeds for storage. The less air and water in your seed container, the longer the seeds will last.

## How Long to Store

If your seeds are properly harvested and packed, and stored in a very cold climate with low humidity, they can last for twenty or more years. The temperature and humidity control is imperative for successful seed storage.



## **Containers for Storage**

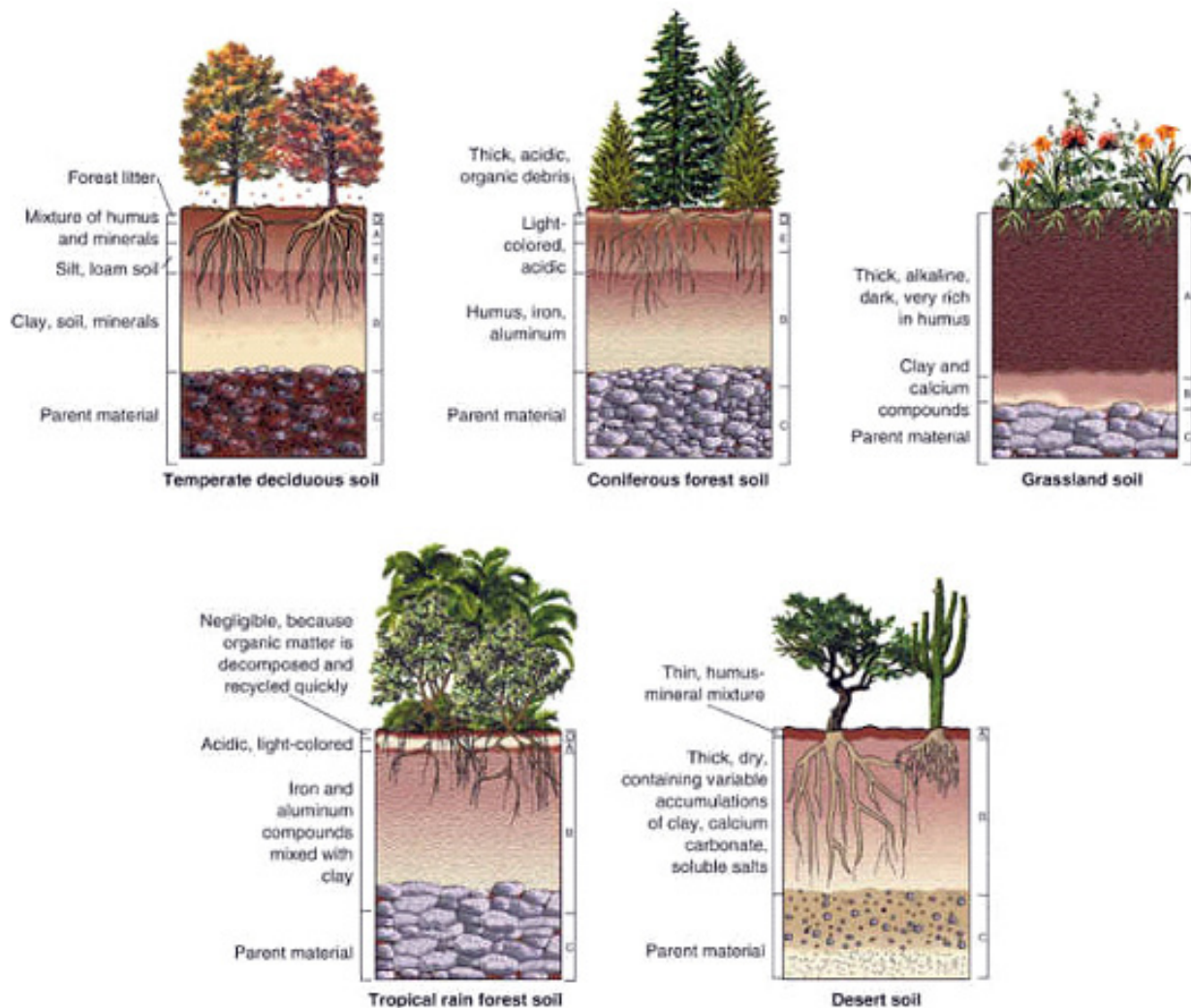
Get the most life out of your seeds by using the right containers to store them. Metal and Glass containers are the most air-tight types of containers. In order to keep diseases and fungi out of your seeds, you do need to thoroughly dry the seeds, and store in a low-humidity, low moisture and low temperature location.

## PART TWO: SURVIVAL GARDENING TECHNIQUES



At some point in the not-so-distant future, you may be required to grow food to feed your family, regardless of whether or not you have gardening or farming experience. As with every industry that has grown from a task once performed by each family, farming is also commercialized and industrialized, and children from urban areas actually think food grows on the grocery store shelves. If you are called upon to grow food to feed your family, if you have the Survival Seed Bank, growing that food will actually be pretty easy. So that you can get the best start gardening, and have good results when your life literally depends on it, the next section uses all of the information you learned from the first part of the book to teach you how to grow the plants and feed yourself and your family.

## CHAPTER THREE: START WITH THE SOIL



Each soil pictured above looks very different, depending upon where it is and what is growing on top of it. For that reason, it is very important for you to get to know your own soil-its characteristics, ins and outs, and what you might need to add to it to make it productive for growing plants. Keep in mind, there is no really “bad” soil, it is just that each soil contains different nutrients, has a different pH and a different structure. Some plants will do better than others on each different type of soil.

## Assessing soil

You can do a soil test, but chances are great that you won't really be able to do that, or have time to do that if you really do need to grow your survival garden. You can judge whether you might need to add things to your soil or work on it a bit by feeling the soil. Grab a handful of soil from about an inch below the surface. Does it feel sandy? Does it feel sticky? Or, does it feel like nice pie crust just before you roll it? If it is the latter, the soil is good to go. If the soil is either very sandy or very sticky, you may want to add some compost if you can.

If you don't have compost for your first year, do not worry-you can still plant your garden and make compost while it is growing so that you can replenish the soil after the first year. If you can, you will want to get some ProtoGrow® fertilizer to use with your survival garden, especially if you do not have access to compost. It contains all essential micro and macro nutrients for healthy plant growth, and can help you jump start your compost, too.

## Preparing the Soil

If you have the chance to prepare your soil for planting, this is what is recommended:

- ▶ If you don't have time or the equipment to turn over an entire garden, dig strips of grass up to form rows to hold the vegetables.
- ▶ In the soil you have uncovered in which to grow vegetables, dig down about six to eight inches, adding compost. If you cannot add compost, simply plant the seeds and fertilize with ProtoGrow®.
- ▶ Once your survival garden is going, dig up another area of the lawn to prepare for next year's garden. In that area, chop up grass clippings, leaves and plant-based kitchen scraps and spread them in a one to two inch layer over the soil. This is a broad composting method .
- ▶ After about three to five weeks, turn the soil under. You can then add another layer of compost. This is a slow, but manageable way of making your garden more fertile, one patch at a time.



- You can also mow areas of the yard that you would like to garden, scalping it repeatedly.

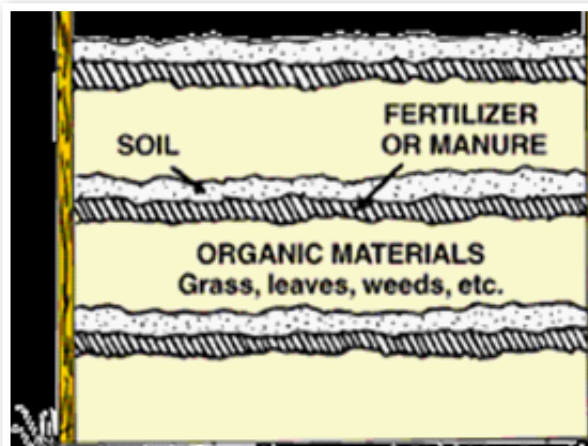
Eventually, the grass will die, you can turn it under, and it will decompose, adding organic matter to the soil and freeing more space for your garden. Again, these are survival garden tips. This is not necessarily the easiest way to make a vegetable garden if you have ample gasoline and power equipment, but it is the easiest and most productive way to make a vegetable garden if you only have hand tools and limited soil amendments.

### **Making Your Own Compost**

At some point during your survival gardening, you will want to make compost so that you can replenish your soil. Making a compost pile is relatively easy and a good way to recycle your vegetable scraps. Don't let highly technical composting books scare you away. You can make a cool compost pile that will cook over the summer while you tend your first year of vegetables so that you can replenish your soil for your next crops.

## Building a Compost Pile

To build an effective compost pile, you need to mix green and brown materials. Green materials are high in nitrogen. Fresh leaves, grass clippings, plant-based kitchen scraps and animal manures have lots of nitrogen. Twigs, wood chips and dried leaves have less nitrogen in relation to carbon. For your pile to work, you need to alternate layers of both types of materials. To jump-start your pile, add some ProtoGrow® fertilizer or a couple of shovels full of soil. This will add the bacteria needed to break down the materials. Keep the pile moist, but not wet. If you feel heat rising from the pile, turn it. If not, you can leave it to decompose.



Symptoms	Problem	Solution
The compost has a bad odor.	Not enough air	Solution Turn it. Add dry material if the pile is too wet.
The center of the pile is dry.	Not enough water	Moisten and turn the pile.
The compost is damp and warm only in the middle.	Too small	Collect more material and mix the old ingredients into a new pile. Turn the pile.
The heap is damp and sweet-smelling, but still will not heat up.	Lack of nitrogen.	Mix in a nitrogen source like fresh grass clippings, manure, composted poultry manure, Bloodmeal, or urea fertilizer.

## CHAPTER FOUR: VEGETABLE GARDEN LAYOUT FOR SURVIVAL GARDENING



Laying out a vegetable garden for survival gardening is different than laying out a vegetable garden as a hobby. The food you grow in your survival garden will need to feed your family for a substantial amount of time. You will need to be able to continuously harvest seeds that are viable, meaning they will sprout and grow the same plant the next year. Your access to pesticides, fertilizers and herbicides may be limited, so you need to create your garden design/layout to maximize companion plantings of plants that “work together” to stay healthy and productive.

### Factors to Consider

You will need to think about the following factors when laying out your survival garden:

**Light** – Do you have shade problems. Do you need to remove a tree to let more light into your garden?

**Water** – Are there water restrictions going on? Do you have limited access to water? Has there been an ongoing drought in your area? If so, you might need to space your plantings further apart so that each plant has more access to water on its own.

**Soil type** – Do you have a heavy clay soil, a loamy soil or a sandy soil? You might need to do some soil amendments before you can begin planting.

The planting combinations you select will vary depending upon the conditions and availability of light and water, as well as your available equipment. Some plants cannot be planted too close to each other, or they will cross-pollinate and produce hybrid seeds that either won't germinate, or will not reliably produce food during the next year.

## Companion Planting

Companion planting is the practice of growing complimentary plants together. For instance, radishes are good for warding away cucumber beetles. They can be planted around cucurbits like squash, cucumbers and melons to help dissuade pests from attacking those plants. Onions, garlic and chives make good companion plants for cabbage, broccoli and other members of the cabbage family. Below, are some companion planting suggestions to help your plants help each other.

Plant	Companion(s) and Effects
Asparagus	Tomatoes, parsley, basil
Basil	Tomatoes (improves growth & flavor); said to dislike rue; repels flies & mosquitoes
Bean	Potatoes, carrots, cucumbers, cauliflower, cabbage, summer savory, most other veggies & herbs
Bean (bush)	Sunflowers (beans like partial shade, unless you live up north, sunflowers attract birds & bees for pollination), cucumbers (combination of heavy and light feeders), potatoes, corn, celery, summer savory
Bee Balm	Tomatoes (improves growth & flavor).
Beet	Onions, kohlrabi
Borage	Tomatoes (attracts bees, deters tomato worm, improves growth & flavor), squash, strawberries
Cabbage Family (broccoli, brussels sprouts, cabbage, cauliflower, kale, kohlrabi)	Potatoes, celery, dill, chamomile, sage, thyme, mint, pennyroyal, rosemary, lavender, beets, onions; aromatic plants deter cabbage worms
Caraway	Loosens soil; plant here and there
Carrot	Peas, lettuce, chives, onions, leeks, rosemary, sage, tomatoes
Catnip	Plant in borders; protects against flea beetles

Celery	Leeks, tomatoes, bush beans, cauliflower, cabbage
Chamomile	Cabbage, onions
Chervil	Radishes (improves growth & flavor).
Chive	Carrots; plant around base of fruit trees to discourage insects from climbing trunk
Corn	Potatoes, peas, beans, cucumbers, pumpkin, squash
Cucumber	Beans, corn, peas, radishes, sunflowers
Dead Nettle	Potatoes (deters potato bugs)
Dill	Cabbage (improves growth & health), carrots
Eggplant	Beans
Fennel	Most plants are supposed to dislike it.
Flax	Carrots, potatoes
Garlic	Roses & raspberries (deters Japanese beetle); with herbs to enhance their production of essential oils; plant liberally throughout garden to deter pests
Horseradish	Potatoes (deters potato beetle); around plum trees to discourage curculios
Hyssop	Cabbage (deters cabbage moths), grapes; keep away from radishes
Lamb's Quarters	Nutritious edible weeds; allow to grow in modest amounts in the corn
Leek	Onions, celery, carrots
Lemon Balm	Here and there in the garden
Marigold	The workhorse of pest deterrents; keeps soil free of nematodes; discourages many insects; plant freely throughout the garden.
Marjoram	Here and there in the garden
Mint	Cabbage family; tomatoes; deters cabbage moth
Nasturtium	Tomatoes, radish, cabbage, cucumbers; plant under fruit trees; deters aphids & pests of curcubits
Onion	Beets, strawberries, tomato, lettuce (protects against slugs), beans (protects against ants), summer savory
Parsley	Tomato, asparagus



Pea	Squash (when squash follows peas up trellis), plus grows well with almost any vegetable; adds nitrogen to the soil
Petunia	Protects beans; beneficial throughout garden
Potato	Horseradish, beans, corn, cabbage, marigold, limas, eggplant (as a trap crop for potato beetle)
Pot Marigold	Helps tomato, but plant throughout garden as deterrent to asparagus beetle, tomato worm & many other garden pests
Pumpkin	Corn
Radish	Peas, nasturtium, lettuce, cucumbers; a general aid in repelling insects
Rosemary	Carrots, beans, cabbage, sage; deters cabbage moth, bean beetles & carrot fly
Rue	Roses & raspberries; deters Japanese beetle; keep away from basil
Sage	Rosemary, carrots, cabbage, peas, beans; deters some insects
Soybean	Grows with anything; helps everything
Spinach	Strawberries
Squash	Nasturtium, corn
Strawberry	Bush beans, spinach, borage, lettuce (as a border)
Summer Savory	Beans, onions; deters bean beetles
Sunflower	Cucumber
Tansy	Plant under fruit trees; deters pests of roses & raspberries; deters flying insects, also Japanese beetles, striped cucumber beetles, squash bugs; deters ants
Tarragon	Good throughout garden
Thyme	Here and there in garden; deters cabbage worm
Tomato	Chives, onion, parsley, asparagus, marigold, nasturtium, carrot, limas
Valerian	Good anywhere in garden
Wormwood	As a border, keeps animals from the garden
Yarrow	Plant along borders, near paths, near aromatic herbs; enhances essential oil production of herbs

## **Other Companion Planting Tips**

In addition to the planting tips from above, planting these plants can help keep away pest insects and lure beneficial insects to the garden.

**Mint** – Works well when planted around cabbages. Deters aphids and other cabbage pests.

Marigolds – Helps with nematode suppression and deters other flying insects.

**Basil** – Aphids do not like basil.

Flowering Plants and Herbs – Scattering flowering plants and herbs among your vegetables will help attract beneficial insects and birds, which will also help you fight unwanted insects.

## **Keep Away**

There are some plants that are cross-pollinating and need to be kept away from each other to reliably harvest seeds from year to year. You need to separate squash, and cucumbers so that they do not cross-pollinate. Growing them on separate sides of the garden will do the trick. Plants in the cabbage family are notorious for cross-pollinating, as well. You may actually want to hand-pollinate a few plants of each cultivar or type, and keep them enclosed by a screen to keep them from cross pollinating. More information about cross-pollination risk for each plant type will be given in individual plant sections.

## CHAPTER FIVE: GENERAL PLANT CARE

Regardless of the vegetable variety you are growing, you will need to understand some basic fundamentals of plant care. Learning these skills will allow you to grow healthy vegetables for your family. More specific care instructions are listed with each vegetable in the next section.

### Planting

Some plants are best planted by direct-sowing the seeds into the ground, while others do well when grown from transplants. It depends upon the plant and your location. Some plants need a long time from germination to maturity, and will not reach maturity if direct-sown. For example, some varieties of onions take 100 or more days to reach maturity. There might not be enough time if they are direct-sown in cooler climates.

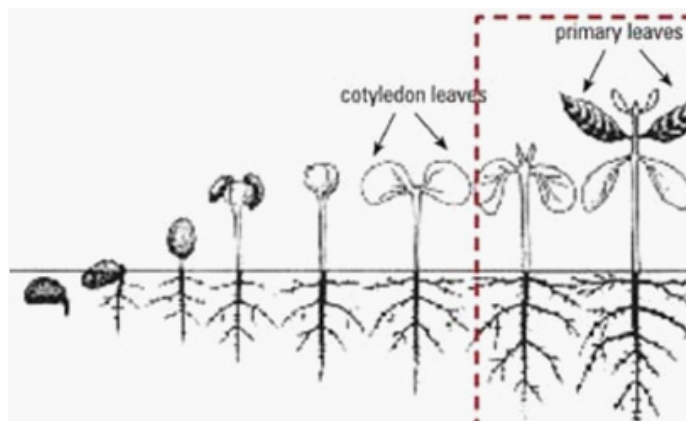


An easy way to start vegetables from seed indoors is to make pots out of newspaper. You can use an open-ended glass and a piece of black and white newspaper. (You can also use paper bags, recycled bills-anything that isn't glossy. Roll the paper around the glass. Push the extra paper at the end into the glass. Then remove the glass and fold the non-bunched end paper under. You can fill the pots with potting soil or regular garden soil.



The plants can be planted directly into the ground in their paper pots because the paper will biodegrade. If you have trouble getting the paper to stick together, you can cover it with a paste made from flour and water. Let the pots dry before using them if you use the flour paste.

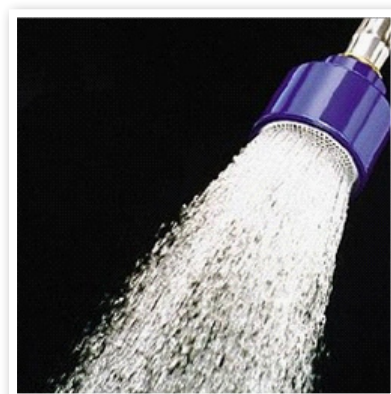
The depth of planting will depend upon the individual seed. Some seeds do not like to be covered by soil at all, though most seeds—even very tiny seeds—will benefit from a sprinkling of light-weight compost or potting mix. For instance, lettuce seeds do best when just barely covered with a light dusting of soil, while bean seeds or peas can be planted as much as one inch below the soil line. Read the instructions on your seed package. When possible, err on the side of not covering them enough, rather than covering too much.



Always thoroughly water the planting row before you plant so that you do not have to water so heavily that you wash away the seeds. If you are going to plant the seed indoors, grow them until they have their second set of true leaves, at least. Then leave the plants outside for a week or so to acclimate. This is called “hardening off.” Then you can plant the plants outside in the planting bed.

### **Watering**

Watering is one of the most important aspects of plant care, and one of the most difficult to teach. Plants need different amounts of water at different points during their life cycle. Germinating seeds need to be kept moist, but not soaking wet, until they have their second set of true leaves and have root systems large enough to soak up the water they need.



Vegetables grow fairly fast, and need quite a bit of water throughout their life cycle; however, they still should never be kept soaking wet. It is better to water deeply a few times a week, than shallowly every day.

A rule of thumb is to count to ten on every plant, and then go back and water again, counting to ten. When possible, always hand-water your plants with a hose, watering wand and breaker. The breaker makes the stream of water softer.

Always water at the base of the plant, never on the leaves and stems, if you can help it. This is especially important if you are watering late in the evening. Water sitting on leaves overnight can lead to spread of disease.

One way to conserve water is to make your own drip-irrigation system with emptied two-liter soda bottles. You can basically fill the bottle with water, poke a very small hole near the lid, replace the lid, and put the bottle upside-down in the ground with the hole in the bottle closest to the plant. The water will gradually drip out. In times of extreme water stress, this method can save your plants. The picture shows a modified version of this method, only it uses an attachment. You may not be able to get the attachment. The main point is that you let the water leak out very slowly. Not letting the water evaporate is also key.

You can collect your own water in a rain barrel that collects water from the roof of your house during a rain. The rain barrel water can then be distributed by hose attached or by watering can.





## **Mulching**

Mulching will also be key to your survival garden. To grow vegetables successfully with little input, you need to conserve resources including water, nutrients and energy. Mulch helps you conserve these items. Mulch also helps prevent weed seeds from sprouting and regulates soil temperature. There are many types of mulch. For your purposes, you will want to use an organic type of mulch that breaks down to add nutrients back into the soil. You will want to use composted leaves, compost, shredded bark mulch, shredded newspapers, or grass clippings to mulch your garden. Water, air and nutrients need to pass through the mulch, which means that you shouldn't use plastic tarps or bags unless you have no other choice. Additionally, landscape fabric doesn't make a good mulch for someone who needs to be careful to put nutrients back into their garden because it blocks weed seeds, but also blocks organic matter from being re-incorporated into the soil. After a couple of years, landscape fabric loses its effectiveness almost entirely because a layer of soil will have begun to build up, which provides an ideal place for weed seeds to sprout.



If you use materials from around your yard to mulch, be aware that your plants might need some supplemental fertilizer. Un composted woody materials like wood chips can actually lower the nitrogen level in soil as the bacteria that digests them uses nitrogen to break down the materials. Below is a list with C:N ratios.

### **High Nitrogen Materials: C:N**

Grass Clippings 19:1

Sewage Sludge (digested) 16:1

Food Wastes 15:1

Cow Manure 20:1

Horse Manure 25:1

## **High Carbon Materials:**

Leaves and Foliage 40-80:1

Bark 100-130:1

Paper 170:1

Wood and Sawdust 300-700:1

If you have a choice of materials to use as mulch, it is better to use high nitrogen materials so that you do not take nutrients away from your plants. Make sure that you leave about an inch or so between the plant stem and the mulch. The dark, humid environment that the mulch creates around the plants is perfect for fungi and bacterial, as well as insects to take hold. Leaving the space will help prevent those problems from getting out of hand.

## **Weeding**

There are reasons beyond aesthetics to weed the garden. Weeds compete with each other and your garden plants for food, water, space and sunlight. When your life depends upon the success of your vegetable garden, you don't want weeds to get in the way. Mulch will help keep weeds from taking over. You can also weed by hand, pulling out the weeds one at a time, or with a weeding fork or hoe. With weeding, it is most important to prevent weeds from going to seed. Once that happens, you not

only have the problem of the weed for the current growing season, but also for the subsequent growing seasons. If it is a hot, sunny day and weeds are small, hoeing them up and leaving them out for the sun to dry will usually do the trick. Be careful not to add your weeds to the compost pile if your pile does not heat up to form "hot compost." If you use weeds that have gone to seed from a cool compost pile, you will put the weed seeds back into your garden.



## **Fertilizing**

If you have heard the saying “you are what you eat,” know that the phrase refers to plants, as well. Plants are only as nutritious as what they can take in. Some plants will synthesize certain compounds more than others, but to grow superior, nutrient-dense foods, you need to have good soil and feed your plants accordingly. ProtoGrow® is a great, seaweed based fertilizer that is natural in origins, and provides all of the micro-nutrients needed to grow plants for subsistence.

## **Pinching**

Whether you pinch your plants depends on your aim. Pinching can produce a more full plant. It can also remove un-productive side-shoots. Removing flowers or buds ensures that the buds that are left develop into larger fruits. People who garden for competition often remove flowers and buds so that they are only growing one fruit per plant. Giant pumpkins are an example of this. While growing your own food, though, you are more likely to want to grow smaller, more numerous and nutritious fruits. You would thin or prune to allow light to reach all of the fruits possible. Tomatoes sometimes need pinching or pruning to keep large, rangy plants under control and to allow light to reach all of the fruits. The image above shows someone pinching off a bud so that it does not sprout at the base of an already prolific stem.



## **Staking**

All of the plants you grow for food were once wild plants, and could hold themselves up. Since we have been “domesticating” the plants, selecting and growing the plants that have the biggest fruits, most tender leaves, etc. some of the plants have gotten to a point where they can’t hold themselves up. That is when you need to stake. Plants that will commonly need staking and are included in the Survival Seed Bank are tomatoes, peppers, and pole beans.



You can use almost anything you can find to stake your plants. Wood stakes, coat-hangers that have been straightened, or string running from a peg in the ground to a clothesline above. The purpose of the staking is to give the plant the support it needs to grow without the stem breaking, which would cause a disruption of the flow of water and nutrients.



### **Thinning**

In order to end up with enough plants making it to maturity to feed your family, you will need to plant more seeds than you plan to harvest. That means that in order to bring your plants to maturity, if some of the seeds are not ruined by disease, insects or other calamity, you will have to thin. Lettuce, radish and spinach plants are most notorious. You know it is time to thin as plants begin to crowd each other. It is that simple. Depending upon how crowded your rows are, you might need to do several rounds of thinning.



### **Harvesting**

After months (or weeks) of hard work, it is time to harvest! Many plants can be harvested at various times of ripeness. Spinach can be eaten when the leaves are tiny, and when the plant has been growing for some time. The same goes for swiss chard and kale. Other plants should be harvested at specific times for freshness and ripeness. To preserve food for future use, harvest at peak freshness. For instance, tomatoes will be deeply colored, but their skin will still be taught over the fruit.

If you are harvesting and would like to leave the plant to keep growing, do not pinch out the top of the plant. Pick leaves from the sides. Harvesting varies so much from plant to plant that more in-depth information will be covered for each plant individually.



## CHAPTER SIX

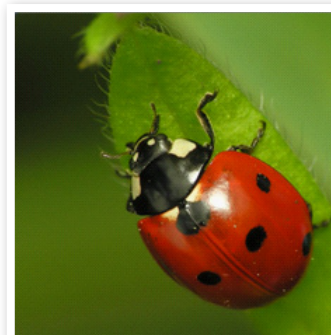
# GARDEN INSECTS: GOOD GUYS AND BAD GUYS

Even with the most careful planning and watchful eye, you will still end up with pests in your garden. Because your capacity to eradicate your garden of pests will lie largely in items you have around your home, the remedies presented for controlling pests are largely those you can make yourself. The pests discussed are the most common pests to afflict vegetable gardens.

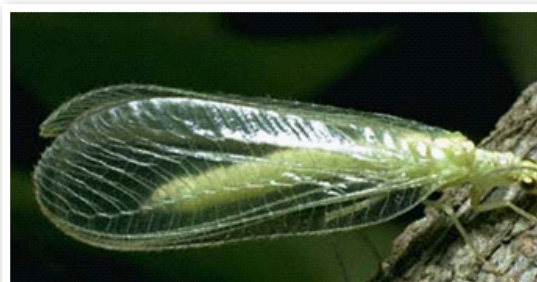
### Beneficial Insects

These insects are worker-bees that actually help you in the garden. Make sure that you do everything possible to keep these insects around.

**Ladybugs** – Ladybugs are beetles, and there are hundreds of different species. You can keep ladybugs in your garden, eliminating pests by not spraying insecticides. Aphids are one of their favorite foods. A healthy population of ladybugs can completely eliminate aphids as a problem in your garden.



**Lacewings** – The larval form of the lacewing is actually the heavy lifter when it comes to keeping your garden free of pests. The larvae will pretty much stay put in your garden if you are lucky enough to lure them there. The adults do fly away, but will often lay eggs before they fly. They are most effective at controlling soft-bodied insects like mites and aphids.





**Big-eyed bugs** – If you don't have a pest that these guys like to eat, they can live on pollen until a pest shows up. They eat mites, aphids, small caterpillars and just about any other garden pest you can think of.



**Parasitic Wasps** – There are several species of parasitic wasps. Most of them are uniquely adapted to only attack a specific pest, though. If they end up in your yard, you can feel thankful, but shouldn't go to great lengths trying to get them. They work on pests by laying their eggs inside the host insect. The larva hatches inside the pest and eats it alive from the inside out.

### **Insects that Cause Damage**

These insects cause a lot of damage in vegetable gardens. Below are their pictures, identifying characteristics and home remedies to banish the detrimental insects.

**Aphids** – Everyone hates to look out into their yard and see an aphid infestation. This is because aphids reproduce rapidly, and every state of the insect does damage. Aphids damage plants by sucking the juices out of the plant leaves. They produce a sticky substance called “honeydew,” which ants like. If you have an aphid problem, chances are great that you will eventually have an ant problem, as well. Ants “farm” the aphids for the honeydew. You can control aphids with a diluted soapy water mixture that dries out the animals because they do not have a hard outer coating to protect them. You can also use high pressure water to blast the aphids off of the plants. Ladybugs love to eat aphids, too.



**Grubs/Japanese Beetles** – Japanese beetles do a lot of damage in every form. The grubs (the larval form) eat the roots of plants. They also attract moles, which eat the grubs and make tunnels in the yard.

They are a triple threat. Japanese beetles eat the leaves of the plants and flowers. It is not a good idea to use pheromone traps to trap beetles because the traps can actually lure beetles from neighboring gardens. The best way to control the beetles is to control the larvae-the grubs. Milky Spore is a bacterial disease that can be applied to the lawn and will kill the grubs. Non-plant parasitic nematodes also destroy grubs, and can self-sustain a population. You have to apply the milky spore at the right time in order to have the best grub control.



**Potato Beetles** – These bugs mainly like to eat the leaves of plants. They will eat tomatoes and eggplants, though. If the insects are active during peak flowering, the plant can be heavily damaged. Because they are a hard-bodied insect, insecticidal soaps don't have a big effect. It is much easier to try to prevent the eggs from hatching by using insecticidal soap to dry out the eggs. Encouraging ladybugs and lacewing populations also helps, because those two insects will eat the eggs of the potato bugs.



**Cabbage Worms** – Cabbage loopers eat the leaves of almost every type of plant. They also eat holes in bean pods and will eat through ears of corn. There are numerous pesticides to control cabbage loopers. BT, a bacteria, can also be used to control the bugs. If you don't have pesticide resources available, you can hand-pick the caterpillars and place them in a jar with rubbing alcohol to kill them.



**Cutworm** – Cutworms mostly eat at night, and they do climb up the stems of plants and eat them in half, which is where they get their name “cutworm.” Birds like to eat cutworms, so make your garden as bird-friendly as possible. Additionally, you can protect your plant stems by making a cardboard or plastic collar to put over the plant, and push down into the soil. That is a “barrier” method of protection.



**Slug** – Slugs eat holes in plant leaves and can wreck a crop quickly. They are active at night, but they can be controlled. A shallow, straight-sided container of beer, sunk into the soil so the lip is level with the soil will attract slugs. Watering in the early morning so the soil dries out at night is also good for control. Slugs can be kept away from plants with a sprinkling of diatomaceous earth around the plant, as well.



**Cucumber Beetle** – Cucumber beetles like to eat pretty much everything in sight. In order to keep them from eating young leaves of newly emerging plants, cover the plants with a fine netting or sheets. There is some evidence that planting radishes alongside the plants that could be affected by cucumber beetles will keep them away.



**Mealybug** – Mealybugs suck the sap out of plants and secrete honeydew, which attracts ants and sooty mould. In order to control mealybugs, you will need to control the ants, because the ants will protect the mealybugs. Ants do not like mint, and can be controlled with mint extract. You can make mint extract by boiling several cups of fresh mint with a cup of water. Squeeze out the water and spray the concentrated mint extract on the ants.





**Spider Mite** – Spider mites lay their eggs near the mid-vein of leaves. When the young spider mites hatch, they suck out the plant juices. Mites become out of hand when the plant is overly dry. The best way to rid the garden of mites is to encourage ladybugs to live in the garden. Mites are soft-bodied insects, so they can also be controlled with a mixture of soap and water.



**Tomato Hornworm** – Tomato hornworms eat the stems and leaves of tomato plants. The easiest way to control these beasts is to hand-pick them from the plants.

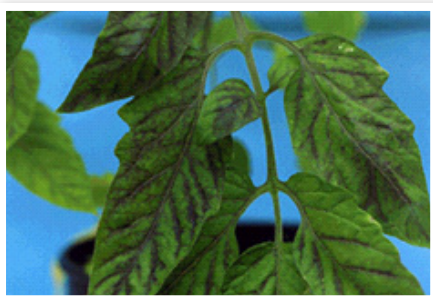
## **CHAPTER SEVEN: NUTRIENT DEFICIENCIES**

This section will give you a good overview of some problems that are likely to “crop up” (pun intended!) in your survival garden. Half the battle with plants is correctly diagnosing the problem if there is one. Unless you can correctly diagnose, you cannot correctly treat.

### **Nutrient Deficiencies**

Because nutrients are such a major component of survival gardening, and gardening for subsistence, when plants have nutrient deficiencies, they must be corrected immediately. For new gardeners, identifying nutrient deficiencies can be tricky. Below is a list of essential plant nutrients, along with a picture and description of the physical symptoms of a deficiency of that nutrient.

**Nitrogen** – Entire plant is light green in color; lower leaves are yellow; growth is stunted.



**Phosphorous** – Entire plant is bluish-green, often developing a red or purplish cast; lower leaves may be yellow, drying to a greenish-brown to black color; growth may be stunted.

**Potassium** – Leaves have a papery appearance; dead areas along the edges of the leaves; growth is stunted.

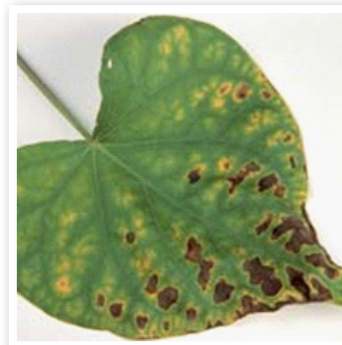




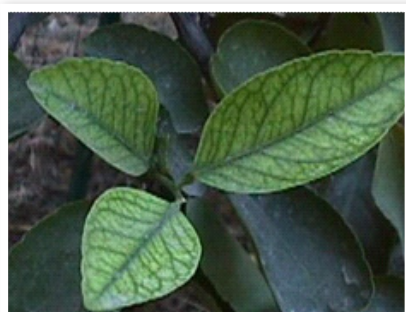
**Magnesium** – Lower leaves turn yellow along the tips and margin and between the veins; the lower leaves wilt.



**Calcium** – Young stems and new leaves die. Causes blossom end rot in tomatoes.



**Zinc** – Leaf tissue between the veins is lighter in color; yellowed; papery in appearance.



**Iron** – Leaf tissue appears yellow, while the veins remain green.

**Copper** – Leaf edges appear dark green or blue; leaf edges curl upward; young leaves permanently wilt.



**Sulfur** – Young leaves turn pale green, while the older leaves remain green; plant is stunted and spindly.

**Manganese** – Growth is stunted; lower leaves have a checkered pattern of yellow and green.



**Molybdenum** – Leaves are stunted, pale green, and malformed.



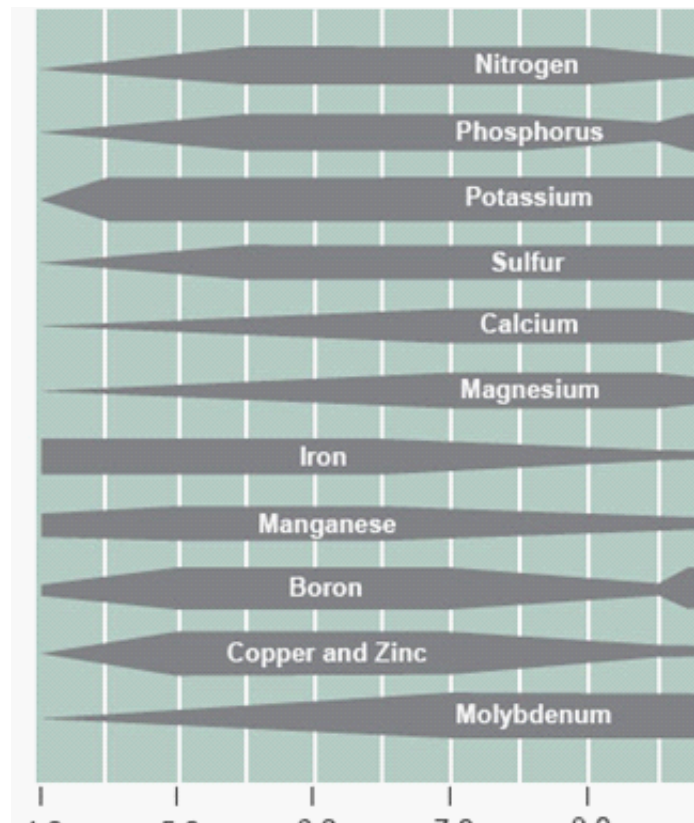
**Boron** – Young leaves are scorched at tips and margins.

**pH Issues** – One factor that highly influences nutrient uptake is the pH of the solution. Most plants do best in a pH range of 6.2-6.8, which is slightly acidic. (A pH of 7 is neutral.) Anything above 7 is alkaline, anything below 6 is considered to be acidic. While plants vary in their pH needs, most will do well in the 6.2-6.8 range. If your plants are exhibiting nutrient deficiencies, one of the first things to do in terms of treatment, before you add anything to your soil, is to test the pH.

Nutrient uptake is affected by the pH of the soil. Below is a chart from Cornell University that shows the most common and necessary plant nutrients and the pH levels at which they become “unavailable” to plants. (Unavailable means that the nutrient might be present, but is not in a form that plants can easily take up. The nutrient might be bound with other elements and “stuck” in the soil.)

## **Nutrient Availability**

The diagram at bottom clearly illustrates the optimum pH for growing plants. There are pH testing kits that will help you test the pH of your soil. You can buy pH testing kits inexpensively, and they are worth the money.



## PART THREE: SPECIFIC PLANT CARE



### **Specific Plant Care (Alphabetical by Plant Type)**

Each type of plant that you will grow from your Survival Seed Kit requires its own care, harvesting and storage. The general gardening instructions will help you make the most of your seed kit, but the way you will be able to grow and perpetuate your seed kit is by following the instructions for individual plants listed in this section. Because the varieties vary from seed kit to seed kit, depending upon seed availability, this section contains information about how to grow each type of plant, rather than a specific cultivar. Some cultivars will have more specific instructions, which will be included on the packets. This information will help you think about how to lay out your garden, and care for the different plant types. Each of these seed varieties was also selected because of its ease of storage and preservation. For more information on canning and storing food, please see <http://www.foodshortageusa.com>.

*Included for each plant is the following information:*

Planting/transplanting, Watering, Harvesting for Eating, Harvesting Seed, Preserving Seed, and Nutritional Benefits.



## **BEANS, DRY**



### **Planting/transplanting**

Sow seeds outdoors after the danger of frost has past and the soil and air temperatures are warm. Plant seeds 1" deep and 2" apart in rows 24" to 36" apart. Pole beans will need support. If you are growing two different types of beans for drying, plant them on opposite sides of the garden, as they will cross-pollinate with each other.

### **Watering**

Water to establish the beans. Once established, beans do not need as much water.

### **Harvesting**

Many dry beans can be eaten young and green, if necessary. The main purpose of growing dry beans is to preserve the beans dry to re-hydrate later in the winter, or save for another time. Wait until the beans are dry on their stalks to harvest.

### **Harvesting seed**

Bean seed pods that are left on the vine to dry can shatter upon touch. Carefully close your hand around the pod and pull the entire pod off the plant and place it in your harvest container.

### **Preserving seed**

It is always best to save seed from plants that ripen first and are free from disease. Harvest seed pods when completely dry, crush in a cloth or burlap sack and winnow the seeds from the chaff. If you have to pull your crop before it has completely dried, hang the plants upside down in a burlap bag and let them dry. As soon as they are dry, store them in a cool, dry, dark location.



## **Nutritional benefits**

You eat only the seeds of dry beans. Before you can eat them, you have to shell them. Beans are a tremendous source of protein. Paired with corn, a meal will deliver a “complete protein,” or the components needed as building blocks for proteins with all necessary amino acids. Beans are also rich in B vitamins, fiber, iron, calcium and phosphorous.

## **BEANS, FRESH**



### **Planting/transplanting**

Sow seeds outdoors after the danger of frost has past and the soil and air temperatures are warm. Plant seeds 1" deep and 2" apart in rows 24" to 36" apart. Pole beans will need support. If you are growing two different types of beans for drying, plant them on opposite sides of the garden, as they will cross-pollinate with each other.

### **Watering**

Water to establish the beans. Once established, beans do not need as much water.

### **Harvesting**

You can eat these beans while they are still young and tender. Harvest before the pods begin to visibly swell with the seeds inside. If not preserved, fresh beans are best eaten within a couple of days of harvesting. The main purpose of growing dry beans is to preserve the beans dry to re-hydrate later in the winter, or save for another time. Wait until the beans are dry on their stalks to harvest.

### **Harvesting seed**

Bean seed pods that are left on the vine to dry can shatter upon touch. Carefully close your hand around the pod and pull the entire pod off the plant and place it in your harvest container.

### **Preserving seed**

It is always best to save seed from plants that ripen first and are free from disease. Harvest seed pods when completely dry, crush in a cloth or burlap sack and winnow the seeds from the chaff.

If you have to pull your crop before it has completely dried, hang the plants upside down in a burlap bag and let them dry. As soon as they are dry, store them in a cool, dry, dark location.

### **Nutritional benefits**

You eat the bean-pod and all for fresh beans. Before you can eat them, you have to shell them. Beans are a tremendous source of protein. Paired with corn, a meal will deliver a “complete protein,” or the components needed as building blocks for proteins with all necessary amino acids. Beans are also rich in B vitamins, fiber, iron, calcium and phosphorous.

## **BEETS**



### **Planting/transplanting**

Sow seeds outdoors in the spring, 6-8 seeds per foot ½” deep in rows 20-24” apart. Minimum soil temperature must be 40° F. Thin the beets, leaving at least 4 inches between each plant. You can eat the young greens in salads. For seed saving, plant beets in the late summer, early fall. These plants will “bolt” or go to seed the following spring.

### **Watering**

Beets are fast growers and need a fair amount of water, especially as the temperatures warm. You can tell if they need to be watered if their tops wilt.

### **Harvesting**

Beets can be harvested for eating at any point during their development. It is better to eat the beets when they are younger and more tender.

### **Harvesting seed**

Beets are biennial, which means that they will not set seed until the second year. Beets will cross-pollinate. Varieties must be separated by ½ mile from other beets the second year when going to seed. Beets are fairly frost tolerant and will overwinter in mild climates if well mulched. In northern climates trim leaves to 2” and store roots in slightly damp sawdust or sand in a root cellar over the winter. Roots store 4-6 months at 32-40° F. Replant in the spring and harvest seed heads when dry. To avoid cross-pollination with other plants in the same family, fold the seed stock over and place a bag over it, stapling the bag to keep insects and pollen out.

## **Preserving seed**

Break apart the beet seed clusters by placing in a bag and gently rolling with a rolling pin. Store the seeds in an air-tight container in a cool, dry location. You will always need to plant more beet seeds than you want finished beets because, even commercially grown beet seed germination rates are 75% after one perfect year of storage.

## **Nutritional benefits**

Beets are high in antioxidants. They provide large amounts of folate, manganese, dietary fiber, potassium, vitamin C, tryptophan, iron and phosphorous.



## **CABBAGE**



### **Planting/transplanting**

Sow indoors ¼" deep in pots or flats 8 weeks before the last frost. Thin seedlings when 2" tall and transplant into individual pots. Plant outdoors 24" apart in rows 36" apart when a light frost is still possible.

### **Watering**

Cabbage plants need an average amount of water. If you are going to over winter plants to set out in the spring, begin watering the stored plants in the late winter before you plant them outside.

### **Harvesting**

Cut the heads of any cabbage you wish to eat when the heads are full and firm. Keep the roots on the plant and wrap the cabbage in newspapers. Store in a cool, humid location.

### **Harvesting seed**

Biennial. Cabbage will cross-pollinate with all other Brassica oleracea, (broccoli, kale, turnips) so isolate by 1 mile the second year when going to seed, or bag the tops of the plants to isolate. Do not harvest heads on plants you intend to save for seed. Carefully dig the plants and pot them in sand. Store plants between 32-40° F. Plant back out in early spring and allow to bolt. You can cut an X in the top of the cabbage head to make it easier for the seed stalk to grow out of the head. Harvest seed pods when dry and clean by hand. The pods will ripen gradually from the bottom of the plant to the top of the stalk. The pods must come to maturity fully while still attached to the plant, or they will not germinate well the next year.

Harvest each pod as it is ripe. If you want to save seeds from numerous types of Brassica, it is a good idea to alternate growing years for consumption and harvest.

### **Preserving seed**

The seed for cabbage plants does not require any special treatment. Only to be kept in a cool, dry location.

### **Nutritional benefits**

High in vitamins A, B, C and E. It also has some anti-cancer properties. Good source of water and fiber.

## **CARROT**



### **Planting/transplanting**

Carrots grow best when direct-seeded in a very light soil that has a mixture of sand and peat. This is so that their roots can develop properly and reach down into the soil. Sow seeds outdoors in the early spring 3-4 weeks before the last frost or as soon as the soil can be worked. Sow seeds  $\frac{1}{4}$ " deep making sure to firmly press soil against the seeds for good soil contact. Keep moist for optimal germination. Thin to 1-4" depending on the size of mature carrots.

### **Watering**

Carrots must be kept evenly moist so that they do not split open when watered. They do not like to be soggy, but kept moist throughout growing. Feed using a liquid food like compost tea or ProtoGrow®. Do not feed with manure or heavy compost, as that can cause the carrot roots to split and become extra hairy.

### **Harvesting**

You will need to thin carrots as they grow, leaving about four inches between each carrot. If the carrots are too close together, they will be stunted. You can harvest carrots and store them for several months by cutting off their tops and packing them in dry straw or dry leaves. They will keep packed this way for five or six months if kept at 80-90% humidity.

### **Harvesting seed**

Carrots are biennials, which means they will produce for eating during the first year and seed the second year. Carrots will cross-pollinate, so isolate  $\frac{1}{4}$  mile from other carrots and Queen Anne's Lace the second year when going to seed.

Dig up carrots in the fall before a hard frost. Trim the tops to 1" and store roots in slightly damp sawdust, sand or leaves in a root cellar over the winter. Replant in the spring and harvest seed heads when dry.

### **Preserving seed**

The flower of a carrot is called an umbel. Harvest seed as each umbel dries out. You can save the seeds in a dry, low-humidity, cool location for several years.

### **Nutritional benefits**

Orange and yellow carrots are the most nutritious varieties. They are high in vitamin A, fiber, vitamin B1, vitamin B2, vitamin B6, vitamin C, vitamin K, biotin, potassium and thiamine.

## **CHARD**



### **Planting/transplanting**

Sow seeds outdoors early in the spring. Plant seeds ½” deep and 4” apart in rows 20-24” apart. Thin seedlings to one every 12”. Minimum soil temperature should be at least 40° F. Chard is very heat resistant and will keep producing through the summer, filling in when spring greens are done.

### **Watering**

As a green, chard needs a fair amount of water, and will produce prolifically if watered frequently. If you harvest the whole plant at once, cutting down to within two inches of the ground, water and feed the plant with liquid fertilizer and the plant will come back and keep going.

### **Harvesting**

Swiss Chard can be continually harvested throughout the growing season. Young chard can be eaten as salad greens, just as you would eat young beet greens. To harvest larger chard plants, cut the outer-most leaves for eating, letting the inside leaves grow and mature. You can cut the whole plant down to a few inches above the soil line and it will come back.

### **Harvesting seed**

Varieties must be separated by ½ mile from all other *Beta vulgaris* when going to seed. Will overwinter in mild climates if well mulched. In northern climates trim leaves to 2” and store roots in sawdust or sand in a root cellar. Roots will store 4-6 months at 32-40° F. Replant in the spring and harvest seed heads when dry.



## **Preserving seed**

You will harvest the seed during the second growing season. You can harvest the seed by hand pulling it from the plant in the garden. If it rains a lot in your area during the summer, bring the flower stalks inside and hang upside down in a bag to full dry.

## **Nutritional benefits**

High in vitamin A, K and C. Good source of fiber.

## **CORN, DRY**



### **Planting/transplanting**

Sow seeds outdoors only after the danger of frost has passed. Corn will not germinate properly when the soil is still cold in the spring. Sow seeds 1" deep every 3-4" in rows 3-4' apart. Thin the seedlings to 8" apart after the plants come up. Corn should be planted in a 3-4 row block (instead of one long row) to ensure well filled-out ears.

### **Watering**

Corn is uniquely adapted to water stress. You will know when the plant is stressed if the leaves curl inward. At that time, you will want to water the corn patch.

### **Harvesting**

Dry corn is primarily used to grind for cornmeal. You will want to wait until the corn is completely dry to harvest and shell.

### **Harvesting seed**

All corn varieties are wind-pollinated and will cross-pollinate with each other. Varieties should be hand-pollinated or isolated by 1 mile to ensure purity. You can also grow at least two hundred plants of each variety close together to ensure purity. Allow ears to dry on the plants, harvest and shell.

### **Preserving seed**

To preserve genetic diversity of seed corn, take ears from at least twenty five different plants to harvest. Corn seeds must be completely dry before storage-much like bean seeds.

## **Nutritional benefits**

Good source of vitamin B1 (thiamin), folate, dietary fiber, vitamin C, phosphorus, manganese, vitamin B5 (pantothenic acid). Together with beans, corn also forms a “complete protein” with all of the necessary building blocks of DNA.

## **CORN, FRESH**



### **Planting/transplanting**

Sow seeds outdoors only after the danger of frost has passed. Corn will not germinate properly when the soil is still cold in the spring. Sow seeds 1" deep every 3-4" in rows 3-4' apart. Thin the seedlings to 8" apart after the plants come up. Corn should be planted in a 3-4 row block to ensure well filled-out ears.

### **Watering**

Corn is uniquely adapted to water stress. You will know when the plant is stressed if the leaves curl inward. At that time, you will want to water the corn patch. Sweet corn benefits from a feeding of compost or liquid fertilizer once during its growth cycle.

### **Harvesting**

Harvest sweet corn when the silks have just barely started to turn brown. If you pierce a kernel with your thumbnail, and "milk" shoots out, the corn is ready to eat. Pull the ear off the stalk and leave the stalk with an ear to ripen for seed.

### **Harvesting seed**

All corn varieties are wind-pollinated and will cross-pollinate with each other. Varieties should be hand-pollinated or isolated by 1 mile to ensure purity. Allow ears to dry on the plants, harvest and shell.

### **Preserving seed**

To preserve genetic diversity of seed corn, take ears from at least twenty five different plants to harvest. Corn seeds must be completely dry before storage-much like bean seeds.

### **Nutritional benefits**

Good source of vitamin B1 (thiamin), folate, dietary fiber, vitamin C, phosphorus, manganese, vitamin B5 (pantothenic acid). Together with beans, corn also forms a “complete protein” with all of the necessary building blocks of DNA.



## **CUCUMBER**



### **Planting/transplanting**

Sow 6-8 seeds outdoors 1" deep in 12" diameter hills spaced 6' apart each way a week after the last frost when soil is warm. Pinch off all but 3-4 of the strongest seedlings. Can be started indoors in pots or flats 3-4 weeks before the last frost for an earlier harvest. To grow more in a smaller space, train the cucumbers up trellises.

### **Watering**

Cucumbers need frequent watering.

### **Harvesting**

Harvest cucumbers before they reach full size. If they are starting to fade and turn yellow, they are too old.

### **Harvesting seed**

To harvest viable cucumber seed, you will need to hand-pollinate the cucumbers. Move pollen from one flower to the other. Hand pollinate during the time of 11 hour days and moderate heat to get the best seed results. Let fruits that you will harvest for seed mature past optimum eating stage. They will begin to soften and turn different colors.

### **Preserving seed**

To preserve the seeds, cut open the cucumbers and scoop seeds into a large bowl. The seeds will need to be fermented for about three days in enough water to cover the seeds. Stir the seeds twice a day. When the seeds have settled to the bottom of the bowl. Add more water and allow the debris to float to the top. Then dry the seeds on a cookie sheet and store in an air-tight, cool container.

## **Nutritional benefits**

Cucumbers are good sources of the following vitamins and nutrients (as long as you eat them with the peel): vitamin C, molybdenum, vitamin A, potassium, manganese, folate, dietary fiber, tryptophan, and magnesium.

## **LETTUCE, HEAD**



### **Planting/transplanting**

Sow seeds outdoors ¼" deep and 1" apart. Thin to 8" apart for loose leaf and 12" for head lettuce. Does well when soil temperature is below 80° F., try to avoid planting in the middle of summer. Keep soil moist for up to two weeks after planting.

### **Watering**

Lettuce is mostly water, and as such, needs a large amount of water.

### **Harvesting**

Harvest head lettuce when the head is fully formed and taught. Lettuce can be stored in humid areas for a couple of months.

### **Harvesting seed**

In order to let the plants bolt, or go to seed, you may need to cut an opening in the top of the lettuce head so that the seed stalk can push its way through. There is only a slight chance of cross-pollination between lettuces. As a precaution separate by 25' from other varieties that are going to seed. Allow plants to bolt and form seed stalks. Seedheads may need to be protected from bird damage and rain when drying. Seeds are produced over a 2-3 week period and will require repeated harvesting.

### **Preserving seed**

Lettuce plants contain a large amount of chaff when harvested. To preserve the seed, you will need to let the seeds dry in a bag, and then clean the chaff from the seeds by using gradually smaller screens.

## **Nutritional benefits**

Lettuce is a good source of fiber. It is also high in Vitamin E, Iron, Folate, Carotenes, Potassium, and Vitamin C.

## **LEAF LETTUCE**



### **Planting/transplanting**

Sow seeds outdoors ¼" deep and 1" apart. Thin to 8" apart for loose leaf and 12" for head lettuce. Does well when soil temperature is below 80° F., try to avoid planting in the middle of summer. Keep soil moist for up to two weeks after planting.

### **Watering**

Lettuce is mostly water, and as such, needs a large amount of water.

### **Harvesting**

Harvest leaf lettuce by picking the outer-most leaves and leaving the inner leaves to mature. Lettuce can be eaten at all stages of growth before the leaves develop a woody mid-rib.

### **Harvesting seed**

There is only a slight chance of cross-pollination between lettuces. As a precaution separate by 25' from other varieties that are going to seed. Allow plants to bolt and form seed stalks. Seedheads may need to be protected from bird damage and rain when drying. Seeds are produced over a 2-3 week period and will require repeated harvesting.

### **Preserving seed**

Lettuce plants contain a large amount of chaff when harvested. To preserve the seed, you will need to let the seeds dry in a bag, and then clean the chaff from the seeds by using gradually smaller screens.



## **Nutritional benefits**

Lettuce is a good source of fiber. It is also high in Vitamin E, Iron, Folate, Carotenes, Potassium, and Vitamin C.

## **MELON**



### **Planting/transplanting**

Best when direct seeded in warm soil after the danger of frost has passed. Plant 6-8 seeds 1" deep in 12" diameter hills spaced 6' apart each way. After germination pinch off all but 3-4 of the strongest seedlings.

### **Watering**

Melons need good drainage in order to not rot. Make sure that the ground slopes down and away from the melon.

### **Harvesting**

It is an eternal question when the melons are ripe enough to pick. They generally need five months from germination to maturity. If you live in an area where the summers are too short, you can use black plastic to heat the soil.

### **Harvesting seed**

It is easy to harvest seed, but difficult to grow enough viable seed for saving from melons. Insect pollination is best, but melons still only produce viable seed with 20% of their flowers.

### **Preserving seed**

Melons will cross-pollinate, so isolate  $\frac{1}{4}$  mile from other "melons" (cantaloupes, muskmelons, honeydew, snake melon and Armenian cucumbers will all cross). Always save seeds from disease-free, early ripening melons. Wash seeds from ripe melons in a strainer and dry. Seeds are ready to store when they break instead of bend.

## **Nutritional benefits**

Melons are high in vitamin A, Vitamin C and calcium.

## ONION, STORAGE



### **Planting/transplanting**

Start seedlings indoors 4-6 weeks before transplanting. You may need to soak the seeds for two or three hours before planting. Sow seeds in flats  $\frac{1}{4}$ " deep and spaced 1" in all directions. Transplant as soon as the soil can be worked in the spring.

### **Watering**

The important part of growing onions is when to stop watering. The onions must dry in order to store well.

### **Harvesting**

The best onions for storage are medium-sized, with no thick neck. Loosen bulbs with a fork and let them dry outside for a few days. Then bring them inside and store them in mesh bags in a cool, dry location that is dark.

### **Harvesting seed**

Biennial. Onions cross-pollinate and should be isolated by 1 mile from other onions going to seed. Select only the best bulbs for seed. Bulbs store 3-6 months at 32-45° F. Plant out bulbs in early spring and allow them to form seed heads. When the heads start to dry, cut off, dry further and thresh.

### **Preserving seed**

You need to store seed in a cool, dry location in an airtight container.

## **Nutritional benefits**

Onions provide a lot of trace nutrients. They are good sources of the following: chromium, vitamin C, dietary fiber, manganese, molybdenum, vitamin B6 (pyridoxine), tryptophan, folate, potassium, phosphorus, and copper.



## **ONION, FRESH**



### **Planting/transplanting**

These onions are also called bunching onions. Start seedlings indoors 4-6 weeks before transplanting. Sow seeds in flats  $\frac{1}{4}$ " deep and spaced 1" in all directions. Transplant as soon as the soil can be worked in the spring.

### **Watering**

Bunching onions do not need a lot of extra water other than rainfall.

### **Harvesting**

You can harvest and eat bunching onions at virtually any part of the life cycle. Just pull up from the ground, wash and eat.

### **Harvesting seed**

Biennial. Onions cross-pollinate and should be isolated by 1 mile from other onions going to seed. Select only the best bulbs for seed. Bulbs store 3-6 months at 32-45° F. Plant out bulbs in early spring and allow them to form seed heads.

### **Preserving seed**

When the heads start to dry, cut off, dry further and thresh. These onions do not keep well for eating.

### **Nutritional benefits**

Onions provide a lot of trace nutrients. They are good sources of the following: chromium, vitamin C, dietary fiber, manganese, molybdenum, vitamin B6 (pyridoxine), tryptophan, folate, potassium, phosphorus, and copper.

## **PEAS**



### **Planting/transplanting**

Peas can be sown as soon as the soil can be prepared in the spring. Sow seeds ½” to 1” deep with 3” between seeds in rows 24” apart. Climbing peas will need support. Double rows can be planted on each side of a trellis. Peas thrive in cool weather.

### **Watering**

Peas do not need a lot of supplemental water.

### **Harvesting**

Your pea variety will determine when you harvest it for eating. Some peas are harvested to eat, pod and all, as snaps, while other peas fatten and are eaten shelled. Pay attention to the packaging to know when to harvest your peas for eating fresh.

### **Harvesting seed**

Pea varieties should be separated by 50’ to ensure pure seed. Select the healthiest plants for seed. Allow pods to dry on the plant before harvesting and separate seeds from pods by hand. If birds start eating the seeds before the pods are completely dry, they can be harvested slightly green and brought indoors to dry.

### **Preserving seed**

Save the seed in cool, dry, dark locations.

### **Nutritional benefits**

Peas are nutritious foods, providing protein, as well as vitamin K, manganese, vitamin C, dietary fiber, vitamin B1 (thiamin), and folate.

## **PEPPERS**



### **Planting/transplanting**

Start seedlings indoors 8 weeks before transplanting. Sow seeds ¼" deep. Keep soil moist and near 80° F. using bottom heat. Peppers may take two weeks to germinate. Transplant outdoors when daytime soil temperatures are near 80°F and night time temperatures are above 50° F.

### **Watering**

Keep watering to a minimum until the pepper has set its first fruit. This will increase fruit-set. Then water regularly, letting the soil dry out between waterings.

### **Harvesting**

"Green peppers" are actually the un-ripe varieties of red and yellow peppers. You can harvest peppers for eating at any stage after they begin growing. Hot peppers can be picked and allowed to dry.

### **Harvesting seed**

Peppers will cross-pollinate, so separate by at least 500' or plant in insect-proof cages covered with window screen. Select peppers that are ripe, fully colored and show no signs of disease to save for seed. Remove seeds off core and place on a paper plate to dry.

### **Preserving seed**

Store seeds in a cool, dry, dark area.

## **Nutritional benefits**

Peppers provide the following benefits for your diet: manganese, vitamin K, iron, and dietary fiber.

## **SPINACH**



### **Planting/transplanting**

Sow seeds outdoors  $\frac{1}{2}$ " deep and 1" apart. Spinach grows best in cool weather and should be planted early in the spring or in late summer to produce a fall crop. For best yield, harvest continually and make successive plantings every 10 days.

### **Watering**

Spinach needs to be watered regularly.

### **Harvesting**

Spinach can be harvested for eating at any time during its life cycle. It is difficult to grow more than one variety of spinach at a time if you plan on saving the seed. You can alternate varieties for this purpose.

### **Harvesting seed**

Spinach will cross-pollinate with wind-blown pollen from other spinach varieties. Commercial seed crops are separated by 5-10 miles to ensure purity, but home gardeners can reduce that distance. Harvest seeds when they are completely dry on the plant. It may be necessary to wear leather gloves because the seeds can be very prickly.

### **Preserving seed**

Seeds must be completely dry before preserving.



## **Nutritional benefits**

Spinach is one of the healthiest foods available. It provides a wealth of vitamins and minerals, including: vitamin K, vitamin A, manganese, folate, magnesium, iron, vitamin C, vitamin B2 (riboflavin), calcium, potassium, vitamin B6 (pyridoxine), tryptophan, dietary fiber, copper, vitamin B1 (thiamin), protein, phosphorus, zinc, vitamin E, omega 3 fatty acids, vitamin B3 (niacin), and selenium.

## **SQUASH, WINTER**



### **Planting/transplanting**

Sow seeds outdoors after the danger of frost has passed. Plant 6-8 seeds 1" deep in 12" diameter hills spaced 6' apart each way. Pinch off all but 3-4 of the strongest seedlings.

### **Watering**

Like melons, winter squash needs to stay well drained in order to not rot on the vine.

### **Harvesting seed**

Squash within the same species will cross-pollinate, so isolate species by ¼ mile. Seeds should be taken from fruits that have gone past maturity by 3 weeks. Remove seeds, wash and let dry. (Note: There are four species of squash: *C. maxima*, *C. mixta*, *C. moschata* and *C. pepo*. This allows you to grow four different species of squash and save pure seed in the same garden.)

### **Preserving seed**

Seeds must be completely dry, and shatter when hit with a hammer in order to keep well.

### **Nutritional benefits**

Winter squash is a highly nutritious vegetable that can be stored for long periods of time to provide nutrients when other, fresher sources of nutrients are not available. Winter squash is high in: vitamin A, vitamin C, potassium, dietary fiber, and manganese.

## TOMATO



### Planting/transplanting

Sow indoors ¼" deep in pots or flats 6 weeks before the last frost. Thin seedlings when 2" tall and transplant into individual pots. Plant outdoors 24" apart in rows 36" apart. Indeterminate vines will require support. (These are non-bush forming tomato plants.)

### Watering

Tomatoes need to be kept evenly moist, or they run the risk of developing blossom end rot. That disease takes hold when the tomato is subjected to wet/dry/wet/dry cycles.

### Harvesting

Harvest tomatoes for eating when they have reached their final color, but the skin is still taught.

### Harvesting seed

Cross-pollination between modern tomato varieties seldom occurs. Do not save seeds from double fruits or from the first fruits of large-fruited varieties. Pick at least one ripe fruit from each of several plants. Squeeze seeds and juice into a strainer and wash, spread on a paper plate and dry. If you have trouble removing the gelatinous seed sack, ferment the tomato seeds in a container of water until a layer of mold completely forms over the surface. Stir the container once a day. Then, pour more water into the mixture and strain out. Dry out of the sun, quickly. Tomato seeds that are moist will begin to germinate quickly.

## **Preserving seed**

Seed needs to be completely dry and stored in a cool, dry, dark place. Do not dry the seed in an oven.

## **Nutritional benefits**

Tomatoes are tremendous sources of anti-oxidants, including lycopene. They are also rich sources of the following nutrients: vitamin C, vitamin A, vitamin K, molybdenum, potassium, manganese, dietary fiber, chromium, vitamin B1 (thiamin), vitamin B6 (pyridoxine), folate, copper, vitamin B3 (niacin), vitamin B2 (riboflavin), magnesium, Iron, vitamin B5 (pantothenic acid), phosphorus, vitamin E, and protein.

## CONCLUSION



This book has given you all of the information you need to successfully grow a survival garden to feed your family in times of world food shortage. Be sure to follow the instructions carefully and pay close attention to your garden plants, and you will be fruitful in your venture. Continually change, grow and refine your gardening techniques and strive to improve your soil at each step of the way. Your life depends on it.