



Rockin E Gardening Handouts

Tips and Suggestions for 'Year-Round' Gardening

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Crop Rotation

Crop rotation is the practice of changing the type of crops growing in a garden each year. Farmers use crop rotation extensively in the management of their fields. Without using crop rotation techniques, farmers would suffer heavy losses in their harvest each year, or have to spend more to maintain their crops.

Home gardeners have a much harder time trying to rotate crops because of their limited amount of space, and the variety of plants they want to grow. A basic Crop Rotation system works best on a three year cycle, with different types of crops being planted in the ground each year. However, if this is not feasible, it is always a good idea not to plant the same type of crop, in the same soil, year after year. Both insects and diseases multiply in the soil, and can greatly affect the productivity of your plants.



This year, when planning your vegetable garden, take a few minutes to consider the benefits of crop rotation.

History

Crop rotation is one of the oldest cultural gardening practices reported in several early civilizations, such as Rome, Asia and Africa.

Crop rotation was extensively researched and developed in the 1880's by George Washington Carver. George Washington Carver was born to slave parents, and grew up on a farm in Missouri. After attending high school and college, he researched the problem farmers were having with decreasing cotton production in their fields.

He developed a rotation schedule of planting peanuts one year, and cotton the next. He then discovered over 325 different uses for the unwanted peanuts. He also taught farmers to alternate with other crops, such as sweet potatoes and soybeans, which helped to enrich the depleted soils.



Reasons

Crop rotation will benefit vegetable crops in two ways: first, it will prevent the build-up of soil-borne pests and diseases; second, it will allow for the replenishment and efficient use of soil nutrients.

Growing vegetables from the same family, in the same soil, year after year, may lead to higher incidences of insect pests and disease problems. Soil-borne diseases may persist in the soil for a long period of time. These diseases tend to attack vegetables that are in the same botanical families, but do not affect plants in different families. Crop rotation is one way to avoid these problems.

Most homeowners tend to just grow the types of vegetables they like, in the same area, year after year. Tomatoes and peppers, for example, are two of the most common vegetables grown by home gardeners. Due to the limited space in backyards, the ground cannot go fallow, and the gardener must have these two favorite vegetables.

So, most home gardeners grow these vegetable plants in the same area, year after year. They may rotate planting



tomatoes and peppers every other year, but that rotation is not doing any good, because they are in the same family of vegetables.

After several years, the plants may seem to become weak, they may be short and anemic, they may not produce very much fruit, or they may just die during the growing season. This can be prevented by following a simple crop rotation schedule.



Insect Pests

Vegetable insect pests tend to feed on similar plants, and members of the same plant family. For example, an insect that attacks cabbage will lay its eggs before it dies. If cabbage, or a member of the cabbage family, is planted in the same spot the next year, the eggs of the insect will hatch, and the insect will find exactly the food it needs to continue its life cycle. If another type of vegetable is planted, the insect may not find the right food, and may die before it can cause any damage.



Soil-borne Diseases

Crop rotation is the only practical way to control many soil-borne diseases. Preventing diseases is more important than preventing insects, because most insects can still be controlled effectively, even if they become overpopulated. Many diseases, on the other hand, can not be controlled once the disease enters the plant. By the time the disease is noticed, it is usually too late to control, and the plant must be destroyed.

Many soil diseases can not be chemically controlled. **Verticillium**, for example, is a soil disease that affects tomatoes and peppers. Because verticillium cannot be controlled chemically, plant breeders have developed varieties of tomatoes that are resistant to it. **Fusarium** and **Tobacco Mosaic Virus** are two other diseases that greatly affect tomatoes, which have no chemical controls.

When you buy tomato plants always look for a "V", "F", or "T" by their name. These letters indicate that the tomato vari-



ety is resistant to these diseases. For example, the Celebrity tomato, is "V,F,T" rated, while the Moscow tomato is not. Celebrity is very disease resistant, while Moscow is not resistant to any of these diseases. Because of these soil diseases, the Moscow tomato is not commonly grown, in favor of the new disease-resistant varieties.

Also, diseases that may only be a small problem one year, may become a major problem the following year, if the conditions are right.

Schedule

Crop rotation is very important when first planning your garden. Generally, it is recommended that vegetables in the same family be rotated in other areas, by growing vegetables from different families, for two years. After 3 years, they can be grown in the same area again. A four, five or six year rotation is even better.

The choice and sequence of crop rotation depends on your personal preference, the soil type, and the climate. Sometimes, it can take several years of trial and error to come up with the right rotation plan for your garden.

How to Start

Make a list of all the plants you want to grow in your garden this year. Divide your plants into vegetable type:

- 1 - Root & Bulb
- 2 - Fruit & Seed
- 3 - Leaf & Stem



Draw a diagram of your vegetable garden, and divide into three areas. Make one area for each vegetable type per year.

For each area, select a different vegetable type for **year 1**. Change to the next vegetable type in **year 2**, and the next type in **year 3**. Go back to the first type selection in **year 4**, and so on. Keep a record of what you grow, and which area you plant it in, as a reminder for the next season.

How to Improve Results

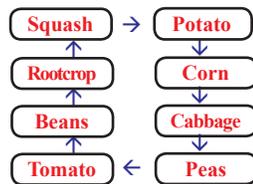
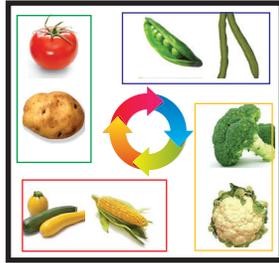
Although the edible parts of vegetables may be different, vegetables may belong to the same family. For example, tomatoes and potatoes are in the same family even though they produce completely different types of food. You cannot rotate tomato plants and potato plants and get the desired results.

In order to come up with a good crop rotation program, it is important to know different families of vegetables.

When planning your crop rotation schedule, remember that you must plant different types of groups in the soil. You cannot just plant a different variety of squash in the same soil each year, you must plant something entirely different.

Plant Groups

Obviously, crop rotation in a small garden may be difficult. However, rotate your vegetable crops as best you can. Rotate your crops between these groups and do not plant any of the same group of plants in the same area year after year.



Solanaceae - Tomato family - tomato, pepper, eggplant, potato, tomatillo.

Alliaceae - Onion family - onions, garlic, leek, shallot, chives;

Cucurbitaceae - Squash family - cucumbers, muskmelon, watermelon, squash, pumpkin, gourd.

Brassicaceae - Mustard or Cabbage family - cabbage, broccoli, cauliflower, Brussels sprouts, kohlrabi, turnip, radish, Chinese cabbage, kale, collards, mustard greens, rutabaga.

Fabaceae - Bean or Pea family - garden pea, snap beans, lima beans, soybean.

Apiaceae - Carrot family - carrots, parsnip, parsley, celery, dill, fennel.

Chenopodiaceae - Beet family - beet, Swiss chard, spinach.

Asteraceae - Sunflower family - lettuce, Jerusalem artichoke, endive, salsify.

Convolvulaceae - Bindweed family (edible part is root) - sweet potato.

Malvaceae - Mallow family (edible part is fruit) - okra.

Poaceae - Grass family (Grains and cereals) - Corn, rice, sorghum, wheat, oat, barley, millet, rye.



Small garden areas. Four rows or Four Plots

Try: Tomato family (year 1); Onion family (year 2); Bean family (year 3); Cabbage family (year 4).

Try: Corn family (year 1); Squash family (year 2); Bean family (year 3); Carrot family (year 4).

Large Garden Areas. Eight rows or Eight Plots.

Try: Tomato family (year 1) Pea family (2), Cabbage family (3) Corn (4) Lettuce Family (5) Squash Family (6) Carrot Family (7) Beet Family (8). If you grow only these eight crops in eight rows, or in eight plots, you now have your rotation plan. Simply line up your crops in the right order, and shift them every year.

Container Gardening & Flower Gardens

Crop rotation is also applicable to home gardeners growing vegetables in containers. Make sure you rotate the types of plants you put in your pots each year. You can also help renew your container garden soils, by adding fresh compost, worm castings, or composted manure whenever you plant a new crop. Replace 20-25% of the mix with fresh materials every year.

If you can't rotate your crops, then you must completely change the soil, and sterilize the container, in order to plant the same type of vegetable, in the same container, every year.

Flower gardens have similar requirements as vegetables, and need to be rotated just the same.

Do not plant petunias and geraniums in the same spot, year after year, or you will notice the plants do not bloom as nicely, and the plants may die prematurely. Unfortunately, there is not a lot of information about which bedding plants to rotate. Use the same principles, and rules as Vegetable Gardens, and you should be fine.

Try some new and different flowers each year, even if you only like 'petunias' and 'geraniums'.

More resources:

- <http://extension.wsu.edu/snohomish/gardenrotation/>
- <http://www.helpfulgardener.com/organic/2006/crop.html>
- http://soilquality.org/practices/row_crop_rotations.html#why_not
- <http://hort.uwex.edu/articles/using-crop-rotation-home-vegetable-garden-0/>
- <http://extension.psu.edu/plants/gardening/fact-sheets/general-gardening/plant-rotation>

