Companion Planting
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What Companion Planting Is, Why It Is Effective, and The Science Behind It.

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Companion Planting: What companion planting is, why it is effective, and the science behind it.

Companion planting is the useful method of inter-mingling numerous varieties of plants to increase growth and control pests. By using what a particular plant outputs and knowing its input needs, you can increase your overall yields without wasting your energy and resources. Not only does wisely pairing plants improve their flavor; it also (more importantly) increases their production. In this book, you will find expert advice about companion planting that helps you to understand both how it works and its benefits. Popular and useful companion examples are provided to make your work easy and efficient. This book offers:

- What is companion planting? Effectiveness of Companion Planting
- Science behind Companion Planting
- Getting Started with Companion Planting
- Beneficial Garden Creatures and Insects
- Tips and Tricks for Companion Planting

Download this companion planting book and learn how to control pests in your garden and improve the flavor of your yield while increasing the quantity of fruits and vegetables.
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Companion planting in agriculture and gardening is essentially the practice of planting different produces in propinquity for pest control benefits and maximization of the space. It takes into account useful creatures in your garden and the best practices to foster them. If done properly, it can dramatically increase the productivity of crops. Gardeners and farmers in developing and industrialized countries use companion planting, a type of polyculture, for numerous reasons.

There are many different strategies to be discussed in companion planning, including the inter-planting of two vegetables that use different layers of the soil profile. For example, the roots of fibrous-rooted tomatoes and tap-rooted carrots utilize different parts of the same area of soil; placing them together allows you to get maximum production per square foot. The plants are kept in proximity to utilize space above the ground. Another effective strategy is maximizing space above ground. Corn, for instance, grows straight and tall. If you plant pole beans near them they will climb the corn stalks; if you plant squash, it can stroll on the ground. Additionally, numerous culinary herbs like dill, parsley, chives and basil have unique abilities to protect the potency of vegetable crops. So much information can be overwhelming, but in this book you will get sufficient advice about companion planting.
What Is Companion Planting? An Overview

Companion planting is a natural way to grow sustainable and healthy gardens while minimizing artificial inputs. It’s the practice of being mindful of how you lay out your garden and the plants you choose to place next to each other in it. If you can create symbiotic relationships between plants, you will see all vegetation begin to flourish on their own. Companion planting enables you to save valuable resources, effort and time.

Increase Yield and Flavor of Fruits and Vegetables

Properly matched plant companions generally do better growing together than when they are individually planted. These plants complement each other, not only physically, but also with their nutritional intakes and growing conditions. Each plant has its own unique requirements and different plants need different, particular substances in the soil to thrive. As plants take from the earth, however, they also give back to the soil. This changes the biochemistry of the soil for surrounding vegetation. If you attempt to grow the same kind of plant in the same soil over
and over, it will eventually deplete the area of the particular nutrition it needs and render the land barren. By rotating what you grow based on an awareness of plant inputs and outputs, however, you can keep your garden at peak productivity.

For instance, planting nasturtium adjacent to radishes improves the flavor of the root crop. Lettuce as a companion can make radishes tender in summer. Dill and tarragon are great to promote the growth of cabbage family and improve their taste. Sweet marjoram planted with cucumbers, pumpkin, eggplants and beans can increase their yield. By understanding the needs and natures of each of these plants, one can easily create a bountiful, flavorful garden.

**Repel Parasites and Pests**

It is well known that numerous fragrant herbs work well as insect repellents, protecting their local companions. By carefully selecting what you plant and where, you can reduce the amount of pests around your garden and minimize your own use of pesticides. Mint is a deterrent to cabbage moths and ants. Lavender may repel ticks, and marigold is good to repel beetles and aphids. Planting them close to roses and tomatoes can help keep these pests away. Daffodils are known to create a protective barrier to rodents and moles around the beds of root vegetables.

**Lure All Pests Away from Target Plants**

Some plants can protect their companion plants, not by repelling pests as previously mentioned, but by enticing the pests (and their predatory foes!) to them. It’s hardly feasible to keep all unwanted pests and parasites away from your garden; attracting organisms that prey on unwanted visitors is a good strategy to manage this efficiently. By actively enticing predators to frequent and linger in the garden,
you can keep the population of unwanted parasites under control. Zinnias, for instance, are always good to plant with cauliflower. They are known to attract ladybugs who, in turn, control other pests like cabbage flies that may cause trouble.

**Regulate Shade**

Some larger, leafy plants provide shade to their companion smaller plants. Shade-loving plants and young seedlings alike appreciate shade during the hottest part of a day. Spinach and radish planted in substitute rows thrive together, as the fast-growing radish can protect young spinach from exposure to too much direct sunlight.

**Help in Pollination**

The bees’ critical role in sustaining life on the planet is well known; consideration should be given to these hard workers and the effect they have on crops and crop production. Fruit and vegetable gardens can benefit endlessly from constant visits from these pollinators. This is good because it essentially ensures a better fruit set and increases the yield of plants such as yarrow, zinnia, bee balm and aster, just to name a few.

**Good Use of Space**

Different plants have vastly different physical characteristics. Some plants may grow tall and thin, while others may have a bushy trail on the ground. When you see a match like this, a good assumption to make is that they’d be effective companions because they do not hinder each others’ development. Companion
plants like this are great as they can optimize the use of available space, but keep in mind that their cultural requirements and harvest time must also be taken into account.

**Improve Health of Soil**

Leguminous plants, such as peas and beans, have root nodes by nitrogen-fixing bacteria. This is hugely beneficial, as nitrogen is consistently the most limiting nutrients in gardens. Legumes, therefore, are good to improve the health of your soil and increase the availability of nitrogen. The entire bean family can be a good companion for plants with high nitrogen needs.

Some plants work well to accumulate a particular nutrient while others with deep root system can bring these nutrients up from deep soil. They can enrich the topsoil and aid the growth of their neighbors.

**Hide Unappealing Areas**

Companion planting is helpful in the ornamental garden as well, as it can help you to hide sore spots. For instance, roses and marigold are good companions for purely aesthetic purposes. Marigold plants can hide the leggy foundation of roses and increase interest with their beautiful flowers. Additionally they are good to repel pests that may create trouble for roses.

**Suppress Weeds**

The growth of many creepers, as they mature, proves helpful to control the weed growth near other plants. For instance, vines, pumpkins, and sweet potatoes can be planted behind bush beans. When these creepers
establish themselves over a wide area like this, they deny the weeds room to grow and access to sunlight. This benefits the companion plants in the area by allowing them to get their required nutrients without the competition of hardy weeds.
Chapter 2

Science Behind Companion Planting

Companion planting should always be considered when developing a useful agricultural strategy, be it via a wicking bed, raised garden bed, small acre/broad acre, or produce farm. It is the basis that helps you to keep your garden healthy without lots of labor or pesticides. The effective combination of plants (a quick reference is provided later in this book) should be the foundation of your design in order to establish and ensure the overall health of your garden. People often wonder how companion planting works and how some plants can be a “good neighbor” to others. It is important to understand the science behind companion planting. It helps you understand the specific characteristics of the different types of plants you are looking to grow. To appreciate the science behind companion planting, you must familiarize yourself with the concept that two (or more!) plants in similar containers or gardens can experience mutually beneficial results.

There is a variety of different factors and elements that need to be taken into account to determine a successful pairing, such as communal climate collaboration, trap cropping, nurse cropping, biochemical pest destruction, symbiotic nitrogen mania, biodiversity, and attraction of valuable insects.

Communal Climate Cooperation

Communal climate cooperation refers to the planting of crops that complement the needs of growing plants around them. You can plant sun-loving, tall plants beside shade-tolerant, shorter
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plants. This combination proves advantageous for both while eliminating the need to spend money on items like shade cloth. It also increases the number of locations on your property where it can be planted. Without using this technique, you would have to ensure that sun-loving plants were on one side of your property and shade-loving plants on the other, based on sun exposure. By using communal climate cooperation, however, both sides are available for either type of plant.

**Nurse Cropping**

A variation of climate cooperation, nurse cropping refers to the utilization of annuals to guard perennials. Annuals are often planted strategically near sun-tender perennials until they can manage the greater wind or sun radiation without any external help. A similar principle is used when an annual is planted to decrease soil erosion, protecting the root system of a neighboring perennial.

**Trap Cropping**

Trap cropping refers to the planting of a particular crop and a lure plant, which is designed to attract certain pests to itself. This is beneficial in the protection of valuable crops, which now have fewer pests damaging them. For instance, collards can draw particular moths away from cabbage. It is different from producing a valuable habitat, wherein a crop is sacrificed to guard another. This type of cropping involves, for example, planting sunflowers along the perimeter of an outdoor garden to protect the small plants growing under them.

**Interdependent Nitrogen Fixation**

Interdependent nitrogen fixation is the practice of placing plants that help produce nitrogen in your garden to replenish the soil. Nitrogen is essential for plants; they can’t survive
without it. However, they can’t use the gaseous nitrogen in the air. Plants utilize nitrogen, in an ammonia form, to manufacture proteins and nitrogen-containing nutrients for their survival. Legumes, beans, and peas are among the few plants that have an ability to fix atmospheric nitrogen with the use of small growth on their roots called nodules.

Bacteria within the root nodes carry out nitrogen fixation, which produces nitrogen (as ammonia) to be absorbed by surrounding plants. As most plants are incapable of this, it is hugely beneficial for produce planted in the area. Interdependent nitrogen fixation is a useful method of ensuring that your garden has ample access to nitrogen. It requires less time, effort, and money than nitrogen additives that are commonly bought over the counter at nurseries and local stores.

Biochemical Pest Overpowering

Some plants radiate chemicals that may protect adjacent plants. For instance, marigolds discharge thiophene, an airborne pest suppression chemical that repels nematodes. Some plants release a pheromone that confuses different male insects to stop their mating; artemisia repels rabbits and various other animals that can be trouble for your garden. You can make a border of artemisia to discourage their presence. By being aware of what plants naturally aid in pest control, you can develop a healthier, more productive garden.

Allelopathy is a phenomenon in biochemical suppression that indicates the release and discharge of chemicals from the root system to discourage rivalry and insects. These chemicals may have a negative or positive influence on surrounding plants, depending on what they are. The negative influence is an important part of the defense, growth, and reproductive systems of another plant. Lantana, for instance, puts out chemicals that will decrease the growth and spread of various weeds. Broccoli is allelopathic and discourages the growth of various other cruciferous crops around the broccoli, such as brussel sprouts, cauliflower, and cabbage.
Enticing Useful Insects

Also known as “habitat influence”, the strategy of enticing useful insects refers to using plants to attract beneficial parasites, predators, and insects. These organisms may aid in destroying or consuming insects who would be harmful to the other crops. This strategy is especially useful when the nearby plant doesn’t have the ability to do this itself. If you want to determine the best type of insects to entice to your garden, you should know what pests are most likely to be attracted to it. Dill and yarrow, for example, are good to attract ladybugs, a helpful creature for your plants as they eat aphids (among other things). If you know you have a plant easily destroyed by this insect, visiting ladybugs should be encouraged. You will learn more about beneficial insects for your garden in later chapters but, for now, you should look at companion planting from an overall perspective instead of with a focus on standalone results.

Biodiversity

Various disease-causing organisms and insects prefer particular species of plants; for instance, both hornworms (also known as tomato worms because of their love of tomatoes) and leaf-footed beetle tends to stick to pomegranate trees. Should a homogenous garden of these plants become infested, it would be difficult to resolve the issue before marring your yield. You should mix up different types of crops to reduce the likelihood of the massive infestation that may result from one single, prevailing crop. If you want to learn the relation of plants with each other, it is a good idea to learn the botanical names of plants. These Latin names prove helpful to become aware of the similarities of plants and help you to increase the diversity in the garden.

Another strategic method is to use florae with diverse generas. For instance, every apple tree has the particular genus, Malus. While their public names look diverse, the plants are really similar quite similar, although they still have individual differences.
Companion Planting in Particular Hydroponics

Hydroponic growing methods involve raising plants in a soil-less medium, such as stone wool, coco coir, or clay pebbles. If you want to grow using this method every plant should have its own container. The growing procedure is different than for plants raised in soil beds. Companion planting for hydroponics is beneficial; if the roots of your plants are putting out allelochemicals, you can utilize them in the recirculation tank. However, depending on your setup, this could be labor intensive.

There are various other stimuli that may come from neighboring plants besides allelopathy. You can grow in a reasonably similar environment and learn how to deal with different insects. To set your fruits, vegetables and flowers, you can either pollinate using insects or manually perform the task yourself. Soiless gardeners may ultimately find that the companion plants provide numerous benefits in a controlled environment.

Companion Plants to Consider

A traditional combination of three sisters, such as squash, beans and corn are great for combination planting. These three crops can grow in ideal harmony. Corn is easy to plant on the top of mounds and, as soon as it is big enough, the beans can be planted to grow up corn. You can plant squash as soon as the beans start to climb the corn plants. To allow maximum sunlight to the squash plants, three feet between cornstalks will be adequate.

Basil is a good neighbor for tomatoes because it can deter mosquitoes, hornworms, and flies. If you want to grow carrots, you can use chives to deter away nematodes, mites, and aphids. Marigolds are a good companion for almost any plant because they discourage harmful insects. If you want to grow cabbage, plant some mint near it to keep beetles, aphids, and moths away.
Avoid These Combinations

In the same way plants can be enhanced by their neighbors, certain combinations prove to be detrimental. Some plants can’t get along; hence, you should avoid these combinations. If you want to grow legumes, for example, it is important to avoid planting garlic or onions in the similar rooting area. You should not combine potatoes and sunflower because of their rooting conflict. Tomatoes and corn can’t get along in a better way. Diversity is essential for the health of your pesticide free, low-labor companion garden.

Before combining two plants, you should understand how one plant can affect other and conduct detailed research about which crops that you want to grow next. Agriculture is a science and, by understanding this science, you can make your future garden successful.
Getting Started with Companion Planting

Companion planting proves beneficial to growing a magnanimous organic garden.

It is a method that uses the properties of each plant in such a way that benefits the whole garden.

Here are some ideas that may be helpful as you get started with companion planting:

**Considerations when Planning Companion Planting to Improve Your Garden**

- **Flavor Improvement**: The combination of some plants can improve the flavors of other plants by living in their proximity.

- **Nitrogen Fixation**: Some plants are self-sufficient in their nitrogen needs but others require assistance. Companions can help other plants in their vicinity.

- **Pest Control**: Some plants act as a pest control by discouraging particular nuisances and guarding other plants that would otherwise fall victim to these pests. These plants can also attract beneficial insects to keep all the predators away.
• **Pollination Increase**: Some plants have the ability to attract pollinators; nearby plants can also reap the benefits from the arrival of these pollinators.

• **Disrupt Generic Planting**: This refers to the growing method of having crops that differ from monoculture crop. This prevents many of the numerous problems that may come with monoculture growing.

• **Support or Shelter**: The collaboration of combination plants often serve to either support or shelter other plants, such as provide a windbreak, shade, support, or additional benefits to growing plants.

You should understand that some combinations can be either beneficial or harmful. Some plants can grow vigorously with other plants while other may not work well. For instance, rue is an herb that is incompatible with various garden plants. Pine trees are famous for secreting a particular chemical that can deter the growth of anything else near or under them. You should learn the compatibility and incompatibility before starting your companion planting:

• **Alfalfa**: It is practically disease and pest free. It is prized for its particular ability to fix nitrogen in the soil. It accumulates potassium, phosphorus, magnesium and iron. Its long taproot can penetrate into soils and make them less compacted. It has a growth height of up to 1 m (3.3 ft.) and characterized by deep roots capable of drawing ground water to a depth of 15m. Growing a variety of grasses together with alfalfa is ideal.

• **Amaranth**: It is compatible with the cabbage and corn family. Amaranth hosts destructive ground beetles and camouflages the odor of cabbage family. They are good to deter predators. It has a growth height of up to 4-8’ and a root depth 18-36”, taproot to 5’. The proper seed planting depth is 1/8-1/4”.

• **Anise**: It is compatible with coriander and hosts wasp predators, which eat aphids. The plant grows to a height of 1-1/2 and 3 feet tall (45cm – 90cm). It requires poor, light, well-drained soil. Fertilizer is not required unless the soil is extremely poor. Great companions include beans and coriander plants.

• **Apple**: Wallflowers are good for apple, but you should not combine apple trees with hawthorn or black walnut. Companion plants include clover, chives, garlic, leeks, nasturtium, southernwood, daffodils, and comfrey. Avoid cedar and potatoes. Growth might be 30 feet or taller in height.

• **Artichoke**: These are good companions for tarragon and sunflower. The peak growth height is 3 to 4 feet tall and up to 4 feet wide. Nutrition needs includes nitrogen, phosphorus and potassium. Good companion plants include most things in the nitrogen-fixing group such as peas and legumes.
• **Asparagus**: Carrots, basil, parsley and tomato are good companions for asparagus, but you should keep onion, leek, garlic and chives away. Nutrients needed include lime, phosphorus, and potassium. Growth height is between 5 ft. tall x 3 ft. wide

• **Basil**: Basil can be planted with asparagus, tomato, capsicum, marigold, kale, collard, cauliflower, cabbage, brussel sprouts, broccoli and beans. With asparagus and tomato plants, it can repel aphids, mosquitoes, mites and flies. It can help with asparagus beetles and tomato hornworms. You should not combine basil with sage or rue. Growth height is 12 to 18 inches (30 -45cm)

• **Beans**: These perform well with most of the vegetables, carrots, cucumber, lettuce and herbs. Keep them away from sunflowers, garlic and onions. They are excellent nitrogen fixers and contribute to the addition of nitrogen in the soil. Growth height is dependent on the family, for example, French beans can be around 18 inches.

• **Beet and Beetroot**: These are good to plant with cabbage family, onions, kohlrabi, beans and lettuce. These are good for adding minerals and magnesium to soil. Mint and garlic help beets to grow their best. You should keep them away from runner beans. Growth height is estimated at 35.0 cm (1.14 feet). Nutrient needs include potassium, phosphorus, and nitrogen.

• **Borage**: Excellent for diverse crops! Good for tomatoes and strawberries. It has the ability to deter tomato worms and, like beans, can add minerals to your soil. Borage proves useful in increasing the disease resistance in proximate plants and enhancing the flavors of strawberries. It attracts predatory insects like the honeybee and, at the same time, repels other insects. Capable of growing to a height of 3 feet (91 cm) and a width of 2 feet (61 cm)

• **Broccoli**: You can grow broccoli alongside tomato, thyme, sage, rosemary, radish, potato, onion, nasturtium, mint, marigold, lettuce, hyssop, garlic, dill, cucumber, beans and basil. These are not good to grow with rue, lettuce and grapes. Its maximum height is around 1/2 feet and it attracts some insect predators while repelling others. For broccoli, turnip is an example of a neighbor that acts as a trap crop.

• **Cabbage Family (kale, cauliflower, Brussels sprouts and broccoli)**: You can combine them with chard, spinach, chamomile, onion family, beets, celery and aromatic herbs. These should not be mixed with pole beans, tomato, strawberries, and dill. Height of between 12-15 inches. It attracts snails and slugs. Optimum pH is six to 6.5

• **Caraway**: This biennial herb is good to plant near shallow rooted crops. It has an ability to loosen compacted soil with its deep roots and its flowers can attract wasps,
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parasites, and parasitic flies. Keep them away from fennel and dill. Growth height is 12 to 24 inches. Good source of iron, copper, calcium, potassium, manganese, selenium, and zinc.

- **Carrots**: You can grow carrots with tomatoes, sage, the onion family, rosemary, lettuce and peas. These are not good companions for celery, parsnips, caraway and dill. Attracts assassin bugs, lacewings, parasitic wasps, yellow jackets, and other predatory wasps. Repels leek moths and onion flies.

- **Catnip**: It is good to deter ants, weevils, squash bugs, Japanese beetles, flea beetles, and mice. These can also attract cats. A good companion for catnip is the eggplant.

- **Celery**: You can combine celery plants with spinach, leeks, beans, nasturtium, tomatoes, the cabbage family and onions. Keep them away from corn, parsley, carrots and parsnips. Repels white flies. Grows to over 18 to 24 inches.

- **German Chamomile**: Grow this plant with aromatic herbs, onions, cucumbers, and cabbages. These are good for hosting wasps and hoverflies, increasing oil production from nearby herbs, and become tonic for all plants near them. This plant grows to 20 to 30 inches (50 - 70cm). It will require well-drained, moist soil and flourishes from full sun to partial shade.

- **Chives**: These are good to plant with roses because they can prevent mildew and repel aphids, nematodes, cabbageworms, and green flies. Growth height of 12 to 18 inches (30 - 45cm).

- **Chrysanthemums (white)**: These can kill harmful nematodes and repel Japanese beetles.

- **Clover**: You can plant clovers with apples and grapes. These are good to attract beneficial insects and great for green compost. It is especially helpful in attracting woolly aphid predators. Height is below 3 inches.

- **Comfrey**: You can combine this plant with avocado and fruit trees. It can accumulate potassium, phosphorus, and calcium and you can use it as slug trap. It is 3-5 feet tall and 2-4 feet wide. It prefers soil with a pH of 6-7.

- **Coriander**: It is good for anise and deters potato beetle, aphids, dill, potato beetles, and spider mites. It attracts tarchinid flies and hoverflies. The maximum height is 18-24 inches (45-60cm).

- **Sweetcorn and Corn**: These plants are useful to combine with white geranium, morning glory, sunflowers, soybeans, parsley, peanuts, melons, amaranth, climbing
beans, squash, cucumbers, pumpkins, peas, beans and potatoes. It provides excellent
tentrills. Keep them away from celery and tomato.

• **Cucumber**: These grow well with nasturtium, carrots, beets, dill, lettuce, celery,
radishes, sunflowers, peas, sweet corn and beans. These are good to grow with
sunflowers because the stems provide a good support for cucumber vines. Potatoes
are bad companions for cucumbers, as are sage and aromatic herbs. Cucumbers require
fertile soil with a pH of 6.0-6.8

• **Eggplant**: Eggplants are good companions of thyme, tarragon, spinach, potatoes,
capsicum, peas, garlic, marigold (as they repel nematodes) and beans. It should not
be combined with fennel. Eggplant can reach a height of 18-36 inches, depending on
the variety.

• **Garlic**: If you want to combine garlic with other plants, it does well with celery, lettuce,
cucumbers, pear trees, apple trees, roses, raspberries, and collard, and benefits from
being near peas and tarragon. It would prove a bad companion for cabbages and grapes.
Garlic accumulates sulfur, which keeps some pests away from the area such as aphids,
Japanese beetles, mites, cabbage looper, ants, cabbage maggots, fruit borers, red spider
mites, and slugs. Growth height can be anywhere between 12 inches to 4 feet.

• **Grapes**: It would be helpful to combine grapes with mulberry trees, elms, chives,
blackberries, peas, beans, basil, and hyssop. You can plant clover with grapes to increase
the fertility of soil. Keep grapes away from cabbage, garlic, and radishes. While the
ideal height is around 40 inches (100cm), an unpruned vine can reach 115 feet. To
grow, grapes require nitrogen, phosphorous, potassium, copper, iron, and zinc.

• **Horseradish**: You can grow horseradish with potatoes to deter blister beetles and
potato bugs, and to increase disease resistance ability of potatoes.

• **Hyssop**: These are good companion with Brassicas, grapes and cabbage. These can
deter flea beetles and cabbage moths and attract honeybees and butterflies. You can
use them to encourage bees to return to their hives. Keep them away from radishes.
Hyssop can reach a height of 24-36 inches (60-90cm).

• **Lavender**: These plants are good to combine with fruit trees because their flowers
provide nectars and attract useful insects. It can play an important role in deterring
codling moths and whiteflies. Lavender can grow to a height of 20-24 inches.

• **Leek**: Combine with carrots to repel carrot flies. It is also helpful to celery, onions,
tomatoes, and passion fruits. Carrots and clover in turn, help it. These are not suitable
companions for legumes. The height they reach is generally around 2-3 feet.
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• **Lettuce**: Good companions of lettuce are collards, beans, marigolds, scallions, spring onions, cucumbers, strawberries, radishes and carrots. Keep them away from fava bean, celery, parsley, cress, broccoli and grains. Lettuce encourages visits from slugs and snails. The height of a mature lettuce is between 6-12 inches (15-30cm).

• **Marigolds (Calendula)**: Famously known as the workhorse for pest deterrents, marigold helps to keep your soils free from nematodes, whiteflies, and other garden pests. Mexican marigold is better for this than French marigold, but you should be mindful if planting Mexican marigold near beans and cabbages, as it may have an herbicidal effect. There is no need to plant marigolds next to beans.

• **Marjoram**: It is good to improve the flavors of many herbs and almost all vegetables. Keep them away from potatoes. In maturity, it will grow to a height of 24-36 inches (60-90cm).

• **Mint**: It is good to plant with tomatoes and cabbages and plays an important role in deterring white cabbage moths. These are very invasive once they start growing and may crowd out your other plants. Their ideal height is between 1-2 feet.

• **Mole (Euphorbia Lathyrus) plant**: If spaced properly in a garden (1 plant for every 5 ft), these can prove an effective barrier against mice, gophers and moles. They can reach a height of 4 ft (120 cm).

• **Nasturtiums**: You can grow them under fruit trees and with cucumbers, cabbages and tomatoes. These are good to deter cucumber beetles, squash bug, whiteflies, and wooly aphids, as well as other pests of the cucurbit family. They also help to attract predatory insects. You should keep them away from cauliflower and radishes. Growth height is between 6-15 inches dependent on the variety.

• **Onion Family**: These are good to grow with tomatoes, strawberries, squash, roses, radishes, potatoes, capsicum, kale, dill, cucumbers, collards, chamomile, celery, cauliflower, summer savories, members of the cabbage family, lettuce, carrots and beets. Inter-cropping with carrots and leeks can confuse onion and carrot flies. When paired, they can protect strawberries from disease. You should keep them away from gladiolus, asparagus, peas and beans.

• **Oregano**: You can plant oregano with beans to enhance their flavors. Oregano is a good companion of grapes, tomatoes, peppers, pumpkins, cucumbers, cauliflower, broccoli, and cabbage. Basils help it. It attracts hoverflies and Syrphidae and repels aphids. Growth height is roughly 12-18 inches (30-45cm).
• **Parsley**: Good for roses, corn/maize, asparagus and tomatoes. Keep it away from mint. Apple, asparagus, and rose help it. It attracts swallowtail butterflies, wasps, and flies. It can reach a height of 12-18 inches (30-45cm).

• **Peas**: You can combine peas with beans, corn, cucumber, turnip, radishes and carrots. Peas can fix nitrogen in your soil. When co-planted with potatoes, gladiolus and the onion family, there will be a mutual suppression of growth. However, the profit per land area was increased. Peas can suppress the Colorado potato beetle.

• **Pennyroyal**: These are good companion for cabbage, broccoli and Brussels sprouts. They are good for deterring cabbage maggots, fleas, ticks, aphids, and ants. Pennyroyal can be poisonous to cats so ensure they are kept away. They can be between 6-12 inches (15-30cm)

• **Pepper**: You can plant pepper with tomato, tansy, the onion family, marjoram, marigold, carrot and beans. Height is 1-3 feet. Avoid co-planting with fennel and kohlrabi.

• **Petunias**: These are good companion for tomatoes. You can plant petunias everywhere to repel garden pests such as tomato worms, beetles of Mexican beans, aphids, leafhoppers, and asparagus beetles. They can reach heights ranging between 6 inches to 8 feet and be as wide as 1 to 4 feet, depending on variety

• **Potato**: You can combine potatoes with horseradish, marigolds, cabbage family, corn and beans. Horseradish is often planted at the edges of a potato patch to provide overall security. Comfrey is good to protect potatoes from scab. You should not combine potatoes with tomatoes, turnip, rutabaga, swede, parsnip, melon family, kohlrabi, fennel, sunflower, cucumber, tomato, squash and pumpkin. These plants can transfer blight to potatoes.

• **Pumpkins**: You can plant pumpkins with marigold, squash, melon, corn, nasturtium and oregano for pest protection. Keep them away from potatoes. Height will be between 1 to 3 feet

• **Radishes**: Some good companions of radishes are squash, the onion family, the melon family, grapes, collard, chervil, carrots, the cabbage family, beans, cucumber, lettuce, nasturtium and peas. Keep them away from hyssop. In maturity, their height will be between 6-18 inches.

• **Rhubarb**: Rhubarb is good to combine with roses, garlic, the onion family, columbine flowers, beans (protection from black flies), and the cabbage family. These plants can deter red spider mites from columbines. Their height is around 2-3 feet.
• **Rosemary**: You can plant rosemary with sage, brassica, carrots, beans and cabbage. Rosemary is good to deter carrot flies, bean beetles and cabbage moths. Their height will be between 3-5 feet.

• **Rue**: You can plant rue with raspberries, figs, fruit, roses and lavender. Raspberries can deter Japanese beetle. Keep rue away from sage, basil, cabbage and cucumber. Their mature height is between 18-24 inches (45-60cm).

• **Sage**: Combine sage with rosemary, carrots and cabbage. It can repel ticks, carrot flies and cabbage moths and attract honeybees and the cabbage butterfly. Keep sage away from onion family, rue and cucumber. Maturity height 4 to 36 inches (60 -90cm).

• **Southernwood**: Southernwood is excellent for Brassicas and fruit trees, as well as cabbage to keep your garden pest free. It can help manage cabbage moths and malaria mosquitoes. Keep an eye on its growth because it is famous for its rapid growth. In maturity, its height will be between 3 and 5 feet.

• **Spinach**: You can combine spinach with peas, celery, beans, fava bean and strawberries. It grows best in soil with a pH of 6.5-7. They grow to a size of 12 inches (30cm) tall.

• **Squash**: Squash should not be planted with potatoes. You can plant squash with marigold, corn and nasturtium.

• **Strawberry**: Bad companions of strawberries are kohlrabi, cauliflower, Brussels sprouts, broccoli and cabbage. You can plant strawberry with thyme, spinach, sage, onion, lettuce, beans and borage. They will usually reach a height of 10-12 inches (25-30cm).

• **Summer Savory**: These are good to plant with beans, garlic and onions to enhance their flavors and protect them from bean beetle. It is good to attract honey bees. It grows to a height of 12-18 inches.

• **Sunflower**: Some good companions for sunflower are squash, corn and beans. Sunflower can attract hummingbirds to eat whiteflies. It is great to use as lures for aphids and keep them away from corn. Keep sunflowers away from potatoes. Based on variety, these plants can range from 2-12 feet.

• **Tansy**: You can plant tansy with raspberries, roses and fruit trees. Tansy can deter Japanese beetles, flying insects, cucumber beetles, ants, mice and squash bugs. These can be toxic and invasive for livestock. Tansy can grow to heights up to 3 feet tall.
Worldwidepermaculture.com

• **Tarragon:** This plant is a good companion for eggplant, as it gives it some benefits. However, tarragon works well by nearly anything because it is a favorite for many pests. It will grow to around 2-3 feet tall.

• **Thyme:** Plant thyme with cabbage to repel cabbage maggots, whitefly, flea beetles, and cabbage worms. It works well with eggplants, onions, potatoes, sage, and tomatoes. It grows to between 6-12 inches.

• **Tomato:** It is good companion for basil, cucumber, parsley, carrot, asparagus, marigold, nasturtium, and onion family to improve their growth and flavor. It is good to repel mosquitoes and flies. Keep tomatoes away from kohlrabi, pole beans, corn (can be attacked by similar worms), black walnut tree, dill, apricot, cabbage family, fennel and potato. If left unpruned, they can grow to more than 7-8 feet.

• **Turnip:** You can combine with onion family and pea for beneficial results. Keep turnips away from potatoes. It usually grows to 6-8in in height.

• **Wormwood:** These can deter animals from entering your garden by planting wormwood as borders. It plays an important role in deterring cabbage worm and black flea beetles. Keep them away from beans and peas. It grows to 1-3 feet.

• **Yarrow:** You can plant yarrow near aromatic herbs to increase the yield of essential oils. It has natural properties to repel insects and great for compost to speed up the breakdown. It works well with nearly anything, including aromatic plants, apricots, chervil, and grapes. It grows to between 2-4 inches.
Chapter 4

Beneficial Garden Creatures and Insects

An ecosystem is shared by all, be it a good species or a bad species. Beneficial insects (and pests!) play an important role in the dynamic relationship required to manage a natural balance. Here is a guide that helps in understand the role of beneficial animals, birds, bugs and insects in the garden:

Birds

The types of bird you will be able to attract to your garden vary with where you live, but they undeniably bring benefits with their presence. If they see you have a proper habitat and shelter for them, birds will enhance your garden in a couple of different ways. First, their feces are rich in nitrogen and provide an excellent fertilizer for your plants. This will especially help with green vegetables.

Birds also are natural predators of insects and bugs, especially when they have young to feed. The type of bugs preyed upon varies by bird species, but some of the most helpful include bluebirds (especially for grasshoppers!), chickadees, cardinals, sparrows, and swallows. These birds can help reduce common, pesky insects such as ants, caterpillars, beetles, snails,
and moths. Some birds, such as woodpeckers, can even help against bugs that bore into your plant life.

Birds can also aid in the pollination in your garden as they fly from plant to plant, or help control weed growth when they eat the seeds of these detrimental plants.

**Dragonflies**

Dragonflies are beneficial for any garden because they eat mosquitoes and flies; in a 15-minute time period, they can ingest half their body weight in bugs. Despite their menacing name, they are not likely to injure people because they do not bite or sting.

If a neighbor or local council does a pesticide spray for mosquitoes in your area, it can also kill the dragonflies. If the population of the dragonfly is in danger in your area, you can re-introduce them by purchasing through mail order or by growing plants around your garden that attract them.

**Frogs**

You can build a pond near your garden to encourage the population of amphibians. Amphibians, particularly frogs, are great for your garden because they can eat flying insects, moths, and flies.

A pond can also help dragonflies in your area to eat mosquitoes. Planting lots of aquatic plants in your pond will prove beneficial as well, as the increase in the density of aquatic plants will increase the diversity of insects associated with pond. Insects near ponds, especially dragonflies, can eat a wider range of pests. This is good for the health of your plants because it reduces the numbers of plant parasites that seek to devour them.
Green Lacewing

Also known as the racewing, these insects work fast and go all-out when eating hundreds of harmful bugs and their eggs. Lacewing larvae are especially predatory, targeting caterpillars, moths, scale insects, mealy bugs, mites, leafhoppers whitefly, and aphids.

The Green Lacewing is easily found worldwide, but if needed you can buy them from bug suppliers and encourage them to stay by offering a varied diet. For a good start, you can give them nectar by growing a variety of flowering plants near your garden. These are more faithful than ladybugs, but the adult race wings may fly around during night because lights often attract them.

Ladybugs

This insect is famously known as “lady beetles” or “ladybirds”, and they look like the dearest lady. It often waddles along, flecked in beautiful spots. They have a roving eye and will desert you for another garden. You can’t expect them to call your property home, even after purchasing them. A safer purchase is, as mentioned, a green lacewing.

Ladybugs are beneficial insects that consume aphids, mealy bugs, and scale. It preys on a lot of soft-bodied small insects; they can quickly clean aphids from your plants. You should resist just picking them up, but instead carefully move ladybugs around your garden. If you want to keep them faithful and true toward you, keep them well fed.

If a ladybug notices you coming toward her, she will curl up and fall off the edge of a leaf. To avoid this, carefully hold your hand out to pick them up and place them in the palm of your hand. Soon the ladybug will stop hiding under their shell, and you can put her anywhere as per your wish, for example, on a badly infested plant on the opposite side of the garden.

Larvae of ladybug are almost 4mm long with the same marking to adults. They are particularly hungry and don’t want to leave your garden, as compared to their parents. There are different kinds of ladybugs, which are differentiated on the basis of their habits and
markings. They come in a yellow color with even strips or red color with black spots. One variety can attack the pupae of innate ladybugs known as Asiatic harlequin bugs. This ladybird has been accidently introduced in a few countries.

**Parasite Wasps**

These are small wasps, unlike yellow-striped bullies that often sting. Parasite Wasps are often divided into various species, and adults feed on pollen and nectar. You can plant flowers near your vegetables to encourage these little creatures. chalcid wasps’ family includes trichogramma, which kills the eggs of the moth type Lepidoptera. This category includes bugs such as coding moth and various others that turn into voracious caterpillar pests.

The trichogramma lays all its eggs in the large eggs of Lepidoptera and hatch out into larvae. Instead of any pesky caterpillar developing from one Lepidoptera moth egg, there is one adult trichogramma wasp wanting to find a mate and initiate the good cycle once again.

Other chalcid wasps from the braconid and Ichneumon family kill numerous pests that suck or eat plants. Parasitic wasps like to prey on grubs, caterpillars, codling moths, leaf rollers, aphids, armyworms, cutworms, corn borers, corn earworms, cabbageworms, cutworms, and tomato hornworms. To invade the eggs of hosts, the parasitic wasps can inject their eggs in live hosts, typically a pest worm or caterpillar.

Other wasps, like trichogramma, lay their white eggs on the outside of one pest. The eggs may turn into larvae, burrow and pupate in the host and make a cocoon on the outside. More wasps can be bought from suppliers.

**Slugs**

Slippery, slimy slugs seem to make havoc nearly everywhere they end up. However, they work like a star in compost because they play a major role in decomposing vegetation anywhere. They can break down fats of
Companion Planting

animals, if you add in fertilizer. The small slugs are the worst for fresh greenery, but adult slugs prefer to decompose waste to make nice compost.

**Spiders**

No one has any love for spiders; most people feel loathing and fear after noticing them. Keep it in mind, however, that spiders are good against predatory insects in your garden and house. The spider can trap and kill a lot of insects. They are really valuable as natural pest controllers; they can even control mammoth and cicadas (these can damage your plants by laying eggs and sucking the roots of trees in their underground nymph stage).

**Woodlice**

Woodlice are found in abundance and known as roly polys, slaters, pill bugs, or sow bugs. They ignore green plants and prefer decayed moist material. They are really sensitive to dry and hot conditions. They can die of dehydration after long exposure, particularly in young molting stages.

These are beneficial insects for breaking down organic matter, but require population explosion. They are famously known for dining on soft and ripe fruits touching soil, like strawberries and plant roots. Young woodlice grow on shoots.

You can control woodlice by keeping them in an area where you don’t require them to swept, dry and free of organic material. If they have composted, mulched and watered garden, they may become overcrowded. You can take advantage of organic pest control for the garden.
Chapter 5

Tips and Tricks for Companion Planting

Companion planting is a good practice to combine jointly beneficial plants collectively in a garden. Here are some examples of common companion combinations for planting:

Combine Hares and Tortoises

As a rule of thumb, you can combine slow-growing plants with fast-growing plants. For instance, cool-season vegetables can be planted with longer-season and heat-loving vegetables to get maximum benefits of a particular plot. This procedure is called intercropping and offers you 2 crops from the similar space.

You can sprinkle the fast-germinating seeds of radishes among slower-to-mature carrots. It is easy to harvest radishes while the carrots are continuing to grow. Another good pair is scallions, cauliflower, and broccoli. You can plant scallions around cauliflower and broccoli and harvest scallions before the cauliflower or broccoli grow big enough to provide them shade.
Success Cropping Plan

When you plant seedlings or sow seeds, consider the duration it takes to grow before you can reap them. For instance, cool-season lettuces may take almost 45 to 55 days to achieve ripeness. You may harvest lettuce progressively until hot climate arrives and as the plants lock (set seed), and are done for the period. You can fill the empty area with one hot-season crop, such as peppers or tomatoes.

Plant Edibles and Flowers

If you desire a vegetable garden and flower garden, you can combine them. Vegetables and flowers can have an ideal companionship. Flowers add color to your vegetable garden and will shine after harvesting of the vegetable crop.

Season Bloomers are Good Companions

You can capitalize on plants species for their natural blooming times. For instance, spring-flowering bulbs such as crocus, daffodils, and tulips, look remarkable while growing among perennials, such as Virginia bluebells, forget-me-nots and bleeding hearts. You can combine perennials and spring bells (perennials and summer bulbs, such as coneflowers and lilies) in the similar border and beds to enjoy the choreography of their flowers in the same season.

Stair-step Planting

If you want to enjoy the glories of all flowers, you can grow tallest plants in back, medium plants in the middle and short plants in front of border or bed. Tall perennials are hollyhocks, buddleia, and baptisia. Midsize perennials are phlox, black-eyed Susan, and purple coneflower. Low-growing perennials are catmint, dianthus, and sedum.
Combine Leapers and Creepers

Indians in North America used a particular plant pairing-bean, squash, and corn. Corn stalks prove good to offer climbing support to beans, and the squash vines can cover the ground as a good mulch to overpower weeds. Other combinations are muskmelons or watermelons. You can add a trellis to the rear of your bed for vertical growth of beans and cucumber.

You can pair harvest buddies as well, such as tomatoes and basil. The combination of different types of foliage is also good for your garden. By planting different species of plants, you can increase the wildlife interest of your yard. It is beneficial for ecosystem and butterflies, birds and insects.
### Companion Planting Chart for a Quick Look

Here is a companion planting chart to have a quick look to companion and incompatible plants:

<table>
<thead>
<tr>
<th>Plant</th>
<th>Companions</th>
<th>Incompatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus</td>
<td>Tomatoes, parsley, lettuce basil</td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>Beets, tomatoes, squash, rosemary, radishes, pumpkins, potatoes, peas, eggplants, cucumbers, corn, celery, cauliflower, carrots, cabbage, broccoli and beets</td>
<td>Radish, peppers, onions, garlic and beets</td>
</tr>
<tr>
<td>Basil</td>
<td>Tomatoes, radishes, peppers, and asparagus</td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td>Spinach, sage, rosemary, potatoes, onion, lettuce, garlic, dill, cucumbers, celery, beets and beans</td>
<td>Tomatoes, lettuce and cabbage</td>
</tr>
<tr>
<td>Cabbage Family</td>
<td>Chard, spinach, chamomile, onion family, beets, celery and aromatic herbs</td>
<td>pole beans, tomato, strawberries, and dill</td>
</tr>
<tr>
<td>Carrots</td>
<td>Tomatoes, sage, rosemary, radishes, peppers, peas, onions, lettuce, garlic, cucumbers and beans</td>
<td>Parsley and dill</td>
</tr>
<tr>
<td>Cauliflower</td>
<td>Sage, onions, potatoes, garlic, cucumbers, celery and beans</td>
<td>Tomatoes and cabbage</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Corn</td>
<td>Squash, radishes, pumpkins, potatoes, peas, lettuce, cucumber and beans</td>
<td>Tomatoes</td>
</tr>
<tr>
<td>Celery</td>
<td>Tomatoes, spinach, sage, rosemary, onions, cauliflower, cabbage, broccoli and beans</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Cucumbers</td>
<td>Radishes, onions, peas, lettuce, garlic, dill, corn, carrots, cauliflower, cabbage, broccoli, beets, and beans</td>
<td>Sage and potatoes</td>
</tr>
<tr>
<td>Dill</td>
<td>Tomatoes, squash, pumpkins, lettuce, cucumbers, cabbage and broccoli</td>
<td>Carrots</td>
</tr>
<tr>
<td>Eggplants</td>
<td>Thyme, potatoes, lettuce, garlic and beans</td>
<td>Tomatoes</td>
</tr>
<tr>
<td>Garlic</td>
<td>Tomatoes, potatoes, peppers, peas, lettuce, eggplants, cucumbers, cauliflower, carrots, cabbage and broccoli</td>
<td>Peas and beans</td>
</tr>
<tr>
<td>Lettuce</td>
<td>Tomatoes, spinach, sage, radishes, potatoes, peas, onions, garlic, eggplants, dill, cucumbers, corn, carrots, cabbage, broccoli, beets and asparagus</td>
<td>Broccoli</td>
</tr>
<tr>
<td>Onions</td>
<td>Tomatoes, spinach, rosemary, radishes, potatoes, peppers, lettuce, cucumbers, celery, cauliflower, carrots, cabbage, broccoli and beets</td>
<td>Sage, peas and beans</td>
</tr>
<tr>
<td>Parsley</td>
<td>Tomatoes and asparagus</td>
<td>Carrots</td>
</tr>
<tr>
<td>Peas</td>
<td>Radishes, beans, potatoes, lettuce, garlic, cucumber, corn and carrots</td>
<td>Onions and garlic</td>
</tr>
<tr>
<td>Peppers</td>
<td>Tomatoes, spinach, onions, garlic, carrots and basil</td>
<td>Beans</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Thyme, broccoli, peas, onions, lettuce, garlic, eggplants, corn, cauliflower, cabbage, and beans</td>
<td>Tomatoes, squash, pumpkins, cucumbers and celery</td>
</tr>
<tr>
<td>Pumpkins</td>
<td>Radishes, dill, corn, and beans</td>
<td>Potatoes</td>
</tr>
<tr>
<td>Radishes</td>
<td>Tomatoes, squash, spinach, pumpkins, peas, lettuce, onions, cucumbers, corn, carrots, broccoli, beans and basil</td>
<td>Beans</td>
</tr>
<tr>
<td>Plant</td>
<td>Benefits</td>
<td>Companions</td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Rosemary</td>
<td>Onions, celery, carrots, cabbage, broccoli and beans</td>
<td></td>
</tr>
<tr>
<td>Sage</td>
<td>Tomatoes, lettuce, celery, cauliflower, carrots, cabbage and broccoli</td>
<td>Onions, cucumbers</td>
</tr>
<tr>
<td>Spinach</td>
<td>Tomatoes, radish, peppers, onions, lettuce, celery, cabbage and broccoli</td>
<td></td>
</tr>
<tr>
<td>Thyme</td>
<td>Tomatoes, potatoes, eggplants and cabbage</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>Thyme, spinach, sage, radishes, peppers, parsley, onions, lettuce, garlic, dill, celery, carrots, beans, basil and asparagus</td>
<td>Potatoes, eggplants, corn, cauliflower, cabbage and broccoli</td>
</tr>
</tbody>
</table>
Companion gardening requires you to have a knowledge of which plant pairs work well. Companion planting is helpful in supporting the natural growing cycle in your garden, as well as ensuring every plant grows to its best potential. It can improve flavors of edible plants, increase productivity, and save you time by reducing the amount of manual labor you have to do, even easing the work of harvesting and watering crops. Companion planting is a good way to control pests, make the best use of space, and enhance pollination.

Companion planting takes planning; in order to obtain the wonderful harvest you desire, you must strategize over every aspect of your garden. It enables you to make good gardening decisions, such as planting corn for trellises and adding beans and squash. If you want to take advantage of companion planting, using the advice and tips given in this book is a wise decision.