

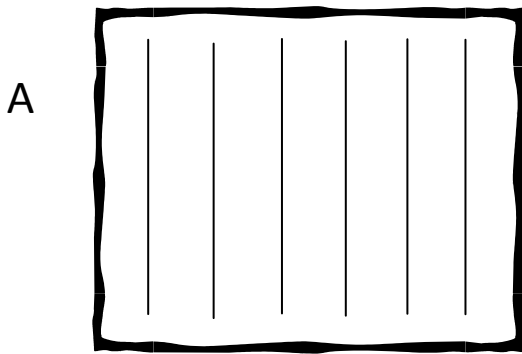
Companion Planting in Your Vegetable Garden

Monoculture vs. intercropping

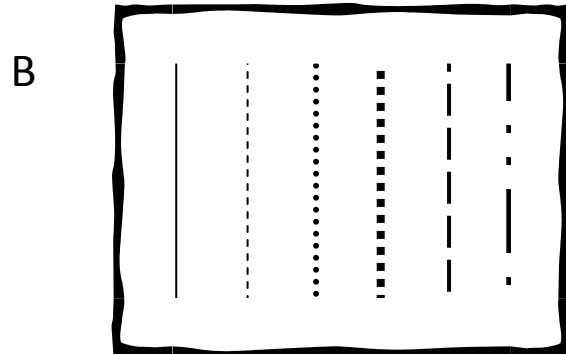
Monoculture – think of a large farm operation. See acres of corn, or onions or lettuce as you are driving down a road. Only one crop is grown.

In our home gardens we may do this by planting areas of our vegetable garden that are specifically for one crop. For instance: Corn is over in one section, all the onions are running down a row here, and the lettuce is over in another row. Dividing up the crops by rows.

From a commercial point of view it is easier to care for and harvest the crop this way.



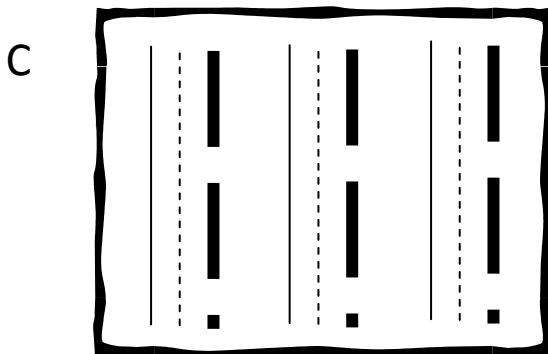
Monoculture- one crop



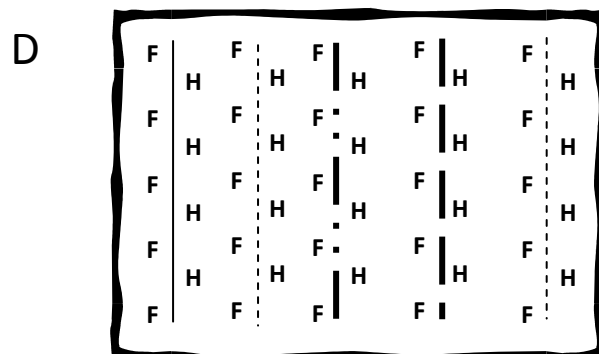
Monoculture- home garden

Intercropping (Companion Planting) is mixing them up.

Intercropping combines pairs plants together for their mutual benefit. It is more efficient, reduces weeds and pests and lowers the risk of crop failure.



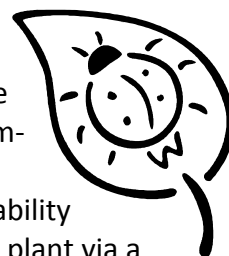
Intercropping- three crops



Intercropping- Flowers,
herbs and crops intermingled
With the crops.

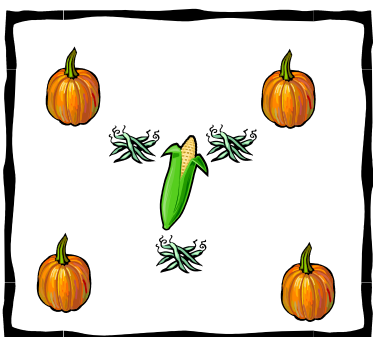
Ways that Companion Planting may help your vegetable garden:

Although scientific data supporting companion planting is sparse, there is an overall agreement these benefits:



1. **Trap cropping**- Luring a pest away from the main crop by planting another more attract plant close by. Usually do not intend to use the lure crop for eating. Example: Carrots or dill in bloom attract tomato hornworm away from tomatoes.
2. **Symbiotic nitrogen fixation**- Legumes such as peas, beans and clover have the ability to fix atmospheric nitrogen for their own use and for the benefit of neighboring plant via a symbiotic relationship with Rhizobium bacteria. Example: beans intercropped with corn.
3. **Biochemical pest suppression**- some plants exude chemicals from roots or aerial parts that suppress or repel pests and protect neighboring plants. Example: Certain varieties of marigolds are a popular cover crop for suppressing root lesions and root knot nematodes (French marigold- *Tagetes patula*, African marigold- *T. erecta*, and South American marigold - *T. minuta*).
4. **Physical spatial interactions**- Tall-growing sun-loving plants sharing space with lower-growing species resulting in higher total yields from the land. And pest control benefits.
5. **Attract beneficial insects** -planting certain flowering plants along side vegetables attracts beneficial insects and other arthropods- especially predatory and parasitic species who need their nectar and pollen. Predators include: lady bird beetles, lacewings, hover flies, robber flies, and non- insects such as spiders and predatory mites. And wasps
6. **Attract birds and wildlife** that will eat insects. Example- Sunflowers inter-planted with vegetables attract birds who eat seeds and insects.
7. **Weed suppressor**- Plants block the light, preventing weeds seeds from sprouting. You will have less weeds if you cover your row with low growing plants. Example: tomatoes- start carrot seeds, cilantro or basil early on the edge of the row where you will be planting the tomatoes. They will begin growing and shade the soil until the tomato creates its own shade.
8. **Dual Cultural benefits**- One plant provides an environmental advantage while another provides a chemical advantage to the other. Example: onions and arugula. A chemical in onions suppresses the flea beetle, while the growing arugula provides shade for the onion.

E



Intercropping example - Three sisters- Developed by native Americans- Benefits all three crops

Corn, beans and squash (pumpkin, zucchini, etc.)
Squash grows between corn and beans- shades the corn roots and the dense prickly vines protect the corn from animal invaders. Corn provides pole for beans and beans offer nitrogen to corn.

Example of physical spatial interaction -the diverse canopy of the squash and corn disorients the adult squash vine borer and discourages raccoons from the corn. Also, symbiotic nitrogen fixation and weed suppression.

Getting Busy on Your Garden

Start with Basic Good Vegetable Gardening Techniques:

Map your garden area

- Make sure that it has 6 - 8 hours of sunlight
- Water source/irrigation
- Composted material worked in
- Fertilizer for vegetables (more for summer crops)
- Mulch around plants
- Make a list of the crops that you want to grow in your garden
- Cool season or warm season? Make sure you have the correct crops for the season
- Family preferences

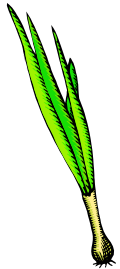


Understanding Plant Families- each plant family is a way of grouping your crops and plants.

- **Botanical Families-** Crops that are genetically related belong in the same botanical family. They often have similar needs and pest problems. Grouping them together helps for crop rotation, watering, fertilizing, and pest management. They may attract the same pests, so will need to intercrop with other plants that can help mitigate this.

Example: Tomato Family has tomatoes, peppers eggplant and potatoes.

- **Feeding Families-** Crops that have similar nutrient needs- heavy feeders, moderate feeders, light feeders and soil builders. Grouping them this way helps with crop rotation planning. By growing plants that have similar nutrient needs together can make sure that the heaviest feeders are given the nutrients they need- richest soil. Light feeders can be where the poorest soil is. Next season rotate your plant families to different area to build up the depleted soil from the heavy feeders.



Examples:

Heavy feeders: celery, corn, cucumbers, eggplant, melons, peppers, pumpkins, squash and tomatoes.

Moderate feeders: broccoli, Brussels sprouts, cabbage, cauliflower, kale, lettuce and other greens, parsley, spinach and Swiss chard.

Light feeders: beets, carrots, garlic, leeks, onions, potatoes, radishes and turnips.

Soil builders: beans and peas.

- **Performance Families-** Crops that help each other grow better by shading. Benefit of higher yields in garden space. Shown on lists that are said to help each other (lists often show the crops that hinder each other too) Example: Three Sisters, or lettuce growing in the shade of a taller plant.
- **Pest-fighting Families-** In these families, one member may help repel or confuse pests that are attracted to another, or lure pests away from another crop (trap crops). Shown on lists that are said to help each other (lists often show the crops that hinder each other too)

Creating Neighborhoods with your Plant Families

Taking your families and placing them together in neighbors hoods. Helpful for crop rotation.

- **Tomato Family Neighborhood-** Tomatoes, eggplant and peppers and greens.
Their friends: Basil, cleome, cosmos, parsley, Queen-Anne's lace, marigolds and onions.

- **Potato Neighborhood-** Potatoes, beans or peas. Their Friends: Calendulas, cosmos, daisies, dill, rosemary. (In southern California, potatoes must be started in early March for June and July harvest).
- **Squash Neighborhood-** Squash family crops, corn, pole beans. Their Friends: Borage, dill, nasturtiums, sunflowers
- **Cabbage Neighborhood-** early spring to early summer (cabbage family members perform better in the fall, winter and spring in the Inland So Cal area). Broccoli, cabbage, cauliflower, Brussels sprouts. Their friends- aster family flowers, marigolds, rosemary, thyme, sage, sweet alyssum, onions, chamomile.

Flower & Herb Companions

Now that you have chosen Plant Families and Neighborhoods, now we can add an important group of friends that attract beneficial insects to your garden.

Tips to keep beneficials attracted to your garden:

#1. Strive for all-season bloom. Spring blooming perennials & annuals- sweet alyssum, chamomile, nasturtiums, calendulas. Summer bloomers- cosmos, marigolds, yarrow. Late bloomers- goldenrod, purple coneflowers. Winter bloomers- alyssum, mustard family flowers.

#2- Include one aster family plant and one carrot family plant with each crop.

Aster family- one of the largest plant families which attract beneficials Examples: daisies, sunflowers, gaillardias, calendula, coreopsis, cosmos, marigold, yarrow

Carrot family- carrots, dill fennel, Queen-Anne's lace, parsley and cilantro

Other flower plant families- cabbage family flowers- sweet alyssum, mustard, broccoli, arugula, radishes that have gone to flower, mint family plants in pots.



How to Plant Your Neighborhoods

1. Make sure that lots of organic material is in your soil.
2. Plant everything more closely so that there is no bare soil exposed when they start growing.
3. Mulch
4. Plant flowers side by side vegetables
5. Scatter seeds in blocks rather than rows. Spread seeds over entire block of bed mixing flowering seeds along with crops seeds.



Resources:

Cunningham, Sally Jean. Great Garden Companions: A companion-planting system for a beautiful, chemical-free vegetable garden. Rodale Press, Inc, Emmaus, Pennsylvania, 1998.

Walliser, Jessica. Good Bug, Bad Bug: Who's who, what they do and how to manage them organically. St. Lynn's Press, Pittsburg, Pennsylvania, 2011.

Sunset Western Garden Book of Edibles: a complete A to Z guide to growing your own vegetables, herbs and fruits. Sunset Publishing company, Menlo Press, 2010

Online: National Sustainable Agriculture Information Service (ATTRA). Website, <https://attra.ncat.org/>