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Sustainable and Urban Agriculture Series **Fact Sheet 08-17**

Companion Planting in Gardening

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Companion Planting is defined as the art of growing plants in proximity to each other because of their ability to enhance or complement the other's growth or attract beneficial insects or repel insect pests. Companion planting is used by farmers and gardeners in both industrialized and developing countries for many reasons. These include pest control, nitrogen fixation, providing support of one plant by another, enhancing nutrient uptake, and water conservation among other benefits. This leads to increased crop productivity as well as enhancement of biodiversity. Many of the modern principles of companion planting were present many centuries ago in the cottage garden. Companion planting is considered to be a form of polyculture, defied as agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops (monoculture). There are many scientific basis for companion:

Trap Cropping: Sometimes, a neighboring crop may be selected because it is more attractive to pests and serves to distract them from the main crop. An excellent example of this is the use of collards to draw the diamond back moth away from cabbage.

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 plants via symbiotic relationship with Rhizobium bacteria. Likewise, beans are sometimes interplanted with corn.

Biochemical Pest Suppression: Some plants exude chemicals from roots or aerial parts that suppress or repel pests and protect neighboring plants. The African marigold, for example, releases thiopene - a nematode repellent - making it a good companion for a number of garden crops. The manufacture and release of certain biochemicals is also a factor in plant antagonism. Allelochemicals such as juglone- found in black walnut- suppress the growth of a wide range of

other plants, which often creates a problem in home horticulture. A positive use of plant allelopathy is the use of mow-killed grain rye as a mulch. The allelochemicals that leach from rye residue prevent weed germination but do not harm transplanted tomatoes, broccoli, or many other vegetables.

Physical Spatial Interactions: For example, tall-growing, sun-loving plants may share space with lower-growing, shade-tolerant species, resulting in higher total yields from the land. Spatial interaction can also yield pest control benefits. The diverse canopy resulting when corn is companion-planted with squash or pumpkins is believed to disorient the adult squash vine borer and protect the vining crop from this damaging pest. In turn, the presence of the prickly vines is said to discourage raccoons from ravaging the sweet corn.

Nurse Cropping: Tall or dense-canopied plants may protect more vulnerable species through shading or by providing a windbreak. Nurse crops such as oats have long been used to help establish alfalfa and other forages by supplanting the more competitive weeds that would otherwise grow in their place. In many instances, nurse cropping is simply another form of physical-spatial interaction.

Beneficial Habitats: Beneficial habitats - sometimes called refugia - are another type of companion plant interaction that has drawn considerable attention in recent years. The benefit is derived when companion plants provide a desirable environment for beneficial insects and other arthropods - especially those predatory and parasitic species which help to keep pest populations in check. Predators include ladybird beetles, lacewings, hover flies, mantids, robber flies, and non-insects such as spiders and predatory mites. Parasites include a wide range of fly and wasp species including tachinid flies, and Trichogramma and ichneumonid wasps. Agroecologists believe that by developing systems to include habitats that draw and sustain beneficial insects, the twin objectives of reducing both pest damage and pesticide use can be attained.

Security through Diversity: A more general mixing of various crops and varieties provides a degree of security to the grower. If pests or adverse conditions reduce or destroy a single crop or cultivar, others remain to produce some level of yield.

Companion Planting Chart for Home & Market Gardening

CROP	COMPANIONS	INCOMPATIBLE
Asparagus	Tomato, Parsley, Basil	Onion, garlic, potato
Beans	Carrot, cabbage, cauliflower, cucumber	Leek, garlic
Beans, Bush	Irish Potato, Cucumber, Corn, Strawberry, Celery, Summer Savory	Onion
Beans, Pole	Corn, Summer Savory, Radish	Onion, Beets, Kohlrabi, Sunflower
Cabbage Family	Aromatic Herbs, Celery, Beets, Onion Family, Chamomile, Spinach, Chard	Dill, Strawberries, Pole Beans, Tomato
Carrots	English Pea, Lettuce, Onion Family, Tomato	Dill, parsnip, radish
Celery	Onion & Cabbage Families, Tomato, Bush Beans, Nasturtium	Parsnip, potato
Corn	Irish Potato, Beans, English Pea, Pumpkin, Cucumber, Squash	Tomato
Cucumber	Beans, Corn, English Pea, Sunflowers, Radish	Irish Potato, Aromatic Herbs
Eggplant	Beans, Marigold	
Lettuce	Carrot, Radish, Strawberry, Cucumber	
Onion Family	Beets, Carrot, Lettuce, Cabbage Family, Summer Savory	Beans, English Peas
Parsley	Tomato, Asparagus	
Pea, English	Carrots, Radish, Turnip, Cucumber, Corn, Beans	Onion Family, Gladiolus, Irish Potato
Potato, Irish	Beans, Corn, Cabbage Family, Marigolds, Horseradish	Pumpkin, Squash, Tomato, Cucumber, Sunflower
Pumpkins	Corn, Marigold	Irish Potato
Radish	English Pea, Nasturtium, Lettuce, Cucumber	Hyssop
Spinach	Strawberry, Faba Bean	
Squash	Nasturtium, Corn, Marigold	Irish Potato
Tomato	Onion Family, Nasturtium, Marigold, Asparagus, Carrot, Parsley, Cucumber	Irish Potato, Fennel, Cabbage Family
Turnip	English Pea	Irish Potato

References

Kuepper, G. and Dodson M. 2009. Companion Planting: Basic Concept and Resources http://attra.ncat.org/attra-pub/complant.html

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