



INTEGRATED PEST MANAGEMENT & COMPANION PLANTING

Integrated pest management (IPM), encourages regular monitoring of insect populations to determine when and if treatments are necessary to minimize unacceptable levels of damage. It employs the use of physical barriers, companion planting, and cultural techniques, in addition to least toxic controls to maintain a proper balance between pest and predator insect. In IPM, total eradication of pest populations is not sought, since it would upset the ecological balance. The individual needs to determine how much pest-related damage can be tolerated (the injury or damage level) without harming the health of plants or people. Following this, the pest population must be studied to assess how rapidly it will increase to produce that level of damage. The final step involves development of a treatment strategy that will keep the pest population small enough so that it doesn't cause an unacceptable level of damage.

COMPANION PLANTING

As part of a well managed IPM system, strategies employing intercropping and companion planting are utilized to increase crop diversity. In this system, many different herbs, flowers, and even weedy groundcovers are used to deter pest insects and attract beneficial predators. Insects locate their preferred food by means of sight, smell, and taste. They use sensitive receptors on their feet and mouthparts that allow them to find a certain crop from a great distance (e.g., the white cabbage butterfly can recognize the mustard oils of the broccoli family from a distance of ten miles).

Plants produce substances that either attract or repel insects. These include:

- **Attractants:** Some examples include mustard oils of the brassica family, that attract cabbage butterflies, apple skins that attract codling moths, onions that produce sulfur and attracts the onion maggot.
- **Stimulants:** These substances encourage feeding and/or egg laying behavior. Bitter chemicals in cucumber and melon skins stimulate feeding by the cucumber beetle.
- **Deterrents:** These substances inhibit feeding or egg laying. Mustard oils sicken spider mites and Mexican bean beetles.
- **Repellants:** These substances force insects to move away from a plant. Juglone from the roots of the black walnut tree keep elm bark beetles away. Citronella and catnip sprays repel many insects.

BENEFICIAL INSECTS TO ATTRACT

Ground beetles and lady beetles:

- Attracted by clovers, tansy and yarrow for egg-laying material; eat aphids, slugs and many soft-bodied pests.

Hover or syrphid flies (also known as flower flies):

- Flat, open flowers such as marigolds or daisies provide areas for egg laying. Their larvae parasitize aphids.

Tachinid flies:

- White clover and members of the carrot family (carrots, parsley, lovage, queen anne's lace, cilantro) provide sites for egg laying. Adults are parasites of Mexican bean beetles and gypsy moths.

Lacewings:

- Increase in numbers when provided with nearby evergreens for shelter. Adults and larvae are fierce predators of soft-bodied pests.

FLOWERS PROVIDING NECTAR AND POLLEN FOR ADULT BENEFICIALS

The whole compositae family is attractive to most beneficial insects and includes such things as:

- Daisies, goldenrods, Black-eyed Susans, coreopsis, asters, bachelor buttons, and lettuces that have bolted and are blooming.

Other flowers and/or herbs that attract beneficial insects include:

- Bee balm (monarda), yarrow, the carrot family, mints, hyssop, and salvia.

Legumes such as peas or beans are used as companions to increase nitrogen levels in the soil. White clover can be used in between corn rows, as well as peanuts. Vetch can be used as a nitrogen providing mulch around fruit trees.

SPECIFIC COMPANIONS THAT MAKE GOOD NEIGHBORS

Beans:	Plant rosemary, marigolds and nasturtiums to repel Mexican bean beetles.
Tomatoes:	Good planted with basil (a possible fly repellent) and asparagus.
Broccoli family:	Try with dill, mint, sage, onions, and southernwood to repel cabbage butterflies.
Chamomile:	Good hosts for hover flies and wasps.
Cucumbers:	Plant with marigolds and onions.
Garlic sprays:	Combine with hot peppers and onions (blenderized) for aphid control.
Carrots:	Plant with peas, leeks, and onions.
Catnip sprays:	Try this for control of aphids and flea beetles.
Peas:	Plant with shade lovers such as spinach and lettuce.
Copper strips:	To repel slugs. Also try fermented yeast traps to attract and drown them. Non-alcoholic "Kingsbury Malt beverage" was the brew of choice (or non-choice) that provided good slug control. Pull mulch away from transplants if weather is rainy and slugs are congregating there.