Integrated Pest Management
Beneficial Insects & Insectary Plants

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Insectary plants are plants that produce pollen or nectar, or provide baits to attract arthropod predators including lady beetles, hoverflies, lacewing, spiders, parasitoid wasps etc.

Lady Beetle (Coccinellidae)

The lady beetle, both the larvae and adult, eat aphids, scales, and mealybugs.

Insectary plants for lady beetles:
- Cilantro, Buckwheat, dill, fennel
- Cowpea
- Marigolds, cosmos
- Oleander (globe lady beetle)
- Morning Glory (*Convolvulus minor*)

Hoverflies (Syrphidae)

Hoverflies: larva eat aphids and other soft bodied insects, and adults eat nectar and pollen.

Insectary plants for hoverflies:
- Cilantro
- Buckwheat
- Marigold, cosmos
- Basil
- Carrot

Green Lacewing (Chrysopidae)

The lacewings, the adult will eat pollen, nectar, and honeydew, and the larvae eat aphids, various larvae and the eggs of other insects.

Insectary plants for lacewings:
- Cowpea
- Bay Leaf
- Carrot (*Daucus* sp.)
- Oleander (*Nerium oleander)*
- Red Cosmos
- Wild Lettuce (*Lactuca* sp.)

Pirate or Assassin Bug

The pirate bug, adults feed on small arthropods like thrips ,aphids and insect eggs. The assassin bug, adults will eat beetles, caterpillars and flies.

Insectary plants for pirate or assassin bugs:
- Macaranga (*Macaranga tanarius*)
- Carrot (*Daucus carota*)
- Oleander (*Nerium oleander*)
- Sunn hemp (*Crotalaria juncea*)
- Cowpea (*Vigna unguiculata*)
- Marigold, cosmos

Parasitoids & Wasps

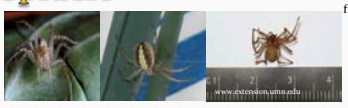
Parasitoid wasps, such as *Lysiphlebus testaceipes* parasitized aphids and mummified the aphids (tan in color). Aphid collecting wasp (*Passaloecus* sp.) collect aphids to feed to their offspring in their nests. They like to find burrows in woody materials to build their nests. *Trichogramma* wasps lay eggs in many Lepidopteron eggs that are pests of many crops.

Insectary plants for parasitoid wasps:
- Cilantro
- Buckwheat
- Milkweed
- Almost all insectary plants

Eggs of Lycaenidae being parasitized by Trichogramma inside sunn hemp flower.

Sunn hemp and cowpea act indirectly as an insectary plants for Trichogramma wasps because the wasp like to come to parasitize Lycaenidae eggs commonly found on sunn hemp flowers. Sunn hemp can be planted as border crop or intercrop.

Spiders



Spiders are generalist that can attack many insect pests especially when no harmful broad-spectrum insecticides are used. They are frequently found wondering on the cinder grow beds, or building webs to catch their preys.

Function of Insectary Plants

- Increase pollen and nectar resources required by the natural enemies of insect pests such as hoverflies and parasitoids (Cowgill et al., 1993; Lavandero et al., 2005; Hogg et al., 2011).
- Attract pollinators.
- Supply food source for spiders (Taylor and Pfannenstiel, 2008).
- Act as trap crops for insect pests.

Attracting Beneficials to Aquaponic System

- Devoting a grow bed of diverse insectary plants around your aquaponic system will draw a variety of beneficial insects and natural enemies of insect pests to your crops. Examples: fennels, marigolds, milkweeds, buckwheat, and cilantro.
- Plant an attractant crop like buckwheat around the border of hydroponic benches to serve as insectary plants that attract hoverflies and wasps. Sunn hemp can be planted on the borders to attract Trichogramma wasps.
- Wasp's nesting box can be constructed and placed around production areas to attract solitary wasps. Most solitary wasps are predators of beetle larva and caterpillars. Photos on the right (below) show how the predatory wasp use the nesting boxes to collect insect pest. Holes that are plugged with soil indicate mud wasps are present and they have laid their eggs (and insect catches) in the nesting boxes.

Grow bed devoted to insectary plants

Hydroponic bench with buckwheat in first row, sunn hemp as boarder, and a wasp nesting block

Close up of the wasp nesting box

Reference and Photo Credit:
http://www.organicgardeninfo.com/beneficial-insectary-plants.html
Concept and photo by Koon-Hui Wang and Jane Tavares, unless specified otherwise in the photo.