

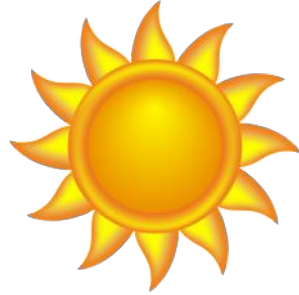
Managing Pests & Diseases



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Plant health depend on the following factors:

Sun



Air



Water

Soil



Space



Factors affecting plant health

Water

Does your plants have enough water?

Over watering can lead to disease

Soil

Is your soil fertile enough?

Your Soil is fundamental for your plant health

Light

Sun plays an important role in your gardening success.

Choose a site that has plenty of sunlight

What are we trying to control?

Pests

Any insect or other small animal that destroy the health of a plant



Diseases

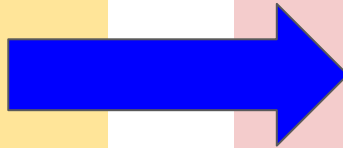
An impairment of the normal state of a plant that interrupts or modifies its vital functions.



Organic Principle ---> Shifting Approach

Pest and disease management

Focus on treatment



Plant health management

Focus on prevention



Plant Stress Factors

Malnutrition



Drought



Injury



Wrong growing conditions



Healthy plants do not need insecticides, pesticides or fungicides. Look at the root cause of the problem, not to the problem.

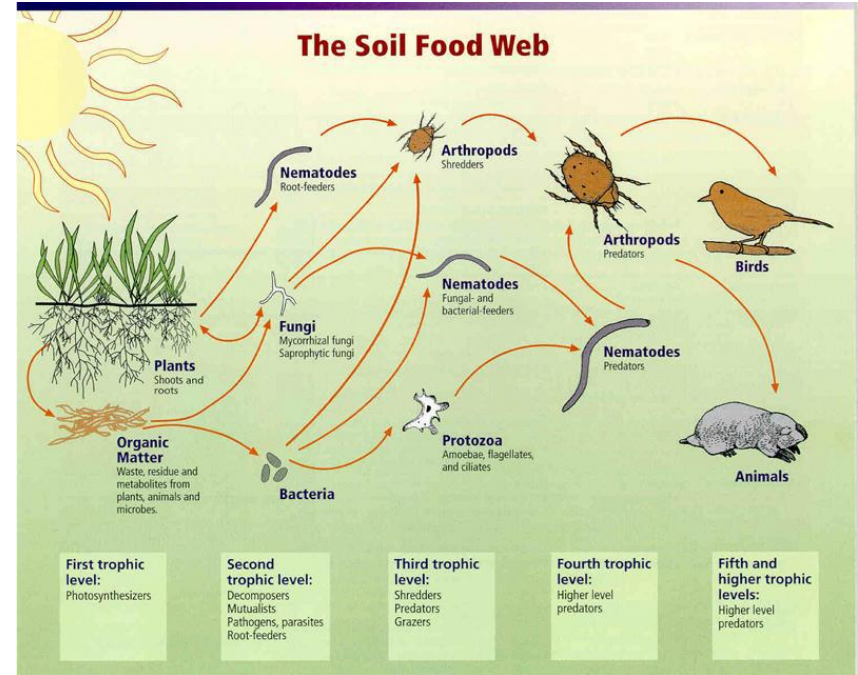


Providing plant support (soil nutrition)

Increase biodiversity of the soil.

If the soil is healthy, the plants can grow well and it can feed the plants that feed us.

There are more than 6 million living organisms in 1 tbsp of soil. These beneficial organisms can be killed by pesticides and herbicides to the soil. Keep the soil fertile all the time.



Relationships between soil food web, plants, organic matter, and birds and mammals
Image courtesy of USDA Natural Resources Conservation Service
http://soils.usda.gov/sqi/soil_quality/soil_biology/soil_food_web.html

Enhancing the soil



Compost



Worm castings: 7x more rich in nitrogen than other fertilizers



Compost tea



Manure

Kelp products

Fish Emulsion

Rock dust

What benefits the soil

Composting organisms

Companion planting

Crop Rotation



Crop Rotation

Don't plant the same crops in the same location year after year.

Rotate between light and heavy feeding crops.

Heavy feeding

Many fruiting crops and long season crops / Tomatoes / Eggplants / Peppers / Squash / Melons / Cucumbers / Broccoli / Kale / corn

Light feeding

Many leafy greens, short season crops, and root vegetables / carrots / radish / onions and leeks / herbs / lettuce / mustard greens / chard / beans / peas

Pests & Diseases
and
how to control them

White Flies

Damage

Tiny moth-like insect that typically feed on the undersides of plants leaves. Large populations can cause leaves to turn yellow, appear dry, or fall off plants.

Crops

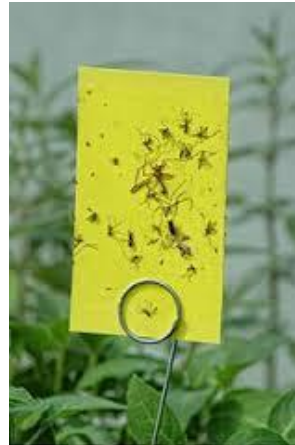
Tomato, Cucumber, Pepper, and ornamentals

Control

Yellow sticky traps

Hand-removal of leaves heavily infested

Spray with insecticidal soap or neem oil



Flea Beetles

Damage

Flea beetles are small beetles that jump when disturbed. They damage plants by chewing small “shot holes” in the leaves.

Crops

Can be found on various plants. But broccoli, kale and mustards are especially susceptible.

Control

Row Cover / Trap crops work in some situations / Spray with insecticidal soap or neem oil / Try this homemade spray to **control flea beetles**: 2 parts rubbing alcohol, 5 parts water, and 1 tablespoon liquid soap. Spray the mixture on the foliage of garden plants that are susceptible to these pests.



Cabbage worms

Damage

Larvae chew large irregular holes in leaves, bore into heads of plants. The most serious damage occurs when larvae feed directly on the harvestable part of the plant.

Crops

Head or stem crops: cabbage, broccoli, cauliflowers, brussels sprouts.

Leafy greens: collards, kale, mustard greens, turnip greens.

Root crops: radish, turnips, rutabaga

Control

Brush off eggs from underside of leaf / Remove weeds from mustard family / Lightweight row cover

Hand pick from plants once a week / Citrus peel spray: chopped peel of any citrus (2 fruit), add 4 cups of boiling water, steep peel in water overnight, spray. - OR - leave orange peels by garden

Neem oil



Cucumber beetle

Damage

Cucumber beetles are serious pests of smooth skinned cucurbits (cucumbers, melons, squash family). They prefer tender, succulent portions of plants including the flowers and leaves

Crops

Cucurbits family

Control

Spread any type of onion skins on the soil around the planted areas

Repellent plants: nasturtiums and marigold

Spray with cayenne pepper and water mixture or neem oil



J. Linduska

Aphids

Damage

Appear as small green, pink, grey or white fly. Affect leave becomes yellow, distorted and sticky.

Crops

Can be found on a wide variety of plants

Control

Spray with cayenne and water mixture or neem oil

Spray with insecticidal soap



Hornworms

Damage

Hornworms feed on blossoms, leaves and fruit

Crops

Tomatoes and eggplants

Control

Hand-pick bugs from plants at least once per week

Spray with insecticidal soap or neem oil



Japanese Beetle

Damage

Produce large, ragged holes in leaves. Begin eating at top of plant and work their way down.

Crops

Can be found on a range of plants

Control

Spray with neem oil

Row covers

Hand-pick from plants at least once per week



Slugs

Damage

Slugs can be one of the most damaging pests of vegetables and flower gardens. Smaller leaves may be eaten entirely, while only the edge of large leaves may be consumed. Signs - clear jelly like eggs.

Crops

Can be found on a range of plants

Control

Reduce moisture in the garden
Remove hiding places for slugs.
Use traps or trap boards to kill or concentrate slugs.

“Beer trap”



Earwigs

Damage

Earwigs can devastate seedling vegetables or annual flower and often seriously damage maturing soft fruit or corn silks.

Crops

Can be found on a wide variety of plants

Control

Use traps or trap boards to kill or concentrate earwigs.

Cooking oil and sugar trap - earwigs go in and can't get out. Works for ants as well.



Leafminers

Damage

Larvae live and feed between leaf surfaces. Photosynthetic activity is reduced and plant is weakened.

Crops

A range of crops, but swiss chard and spinach particularly vulnerable.

Control

Row cover right away and only remove for weeding and harvest.

Life cycle is 15 days and can produce 5000 eggs - crop rotation!

Hand pick to remove leaf with teenager bug inside the leaf.
Spray neem oil.



Powdery mildew

Damage

Fungal, mostly attacks new leaves

Crops

Affect many plants, but especially curcubits family (cucumbers, melons, squash)

Crops in Toronto are especially susceptible because of high humidity here.

Control

Don't shower the leaves

Remove and destroy damaged leaves

Use baking soda or dry cinnamon powder

Crop rotation - don't replant in the same area for 5 seasons if possible.

Disinfect tools after plant contact. Use white vinegar to disinfect tools



Downy Mildew

Damage

Fungal - thrives in cool, moist weather.
Older leaves turn brown and die.

Crops

Affects many plants, specific cucurbits family

Control

Don't shower the leaves
Remove and destroy damaged leaves
Use baking soda



Bacterial wilt

Damage

Leaves appear limp and wilted

Stem collapse

Crops

Cucurbits family

Control

Remove and destroy infected plants immediately

Control cucumber beetle



Cucumber vine with symptoms of bacterial wilt.
(vectored by cucumber beetles).

Fusarium Wilt

Damage

Begins as yellowing and wilting of leaves

Older leaves turn completely yellow

Shoots or whole plant wilts and dies

Kills plants within 10 days

Crops

Solanaceas family (peppers, tomatoes, eggplants)

Curcubits family

Control

Remove and destroy infected plants immediately

Crop rotation 2-3 years



Bacterial Canker

Damage

Fruit develop raised spot with white margins

Crops

Solanaceas family (tomatoes, peppers, eggplants)

Control

Remove and destroy infected plants immediately

Disinfect tools after use with white vinegar

Crop rotation 1-2 years



Tobacco Mosaic Virus

Damage

Humans can spread TMV by handling the plants after touching cigarettes or other tobacco products. Leaves appear mottled with yellow and young growth is narrow and twisted. Fruits may have yellow patches.

Crops

Solanaceas family (tomatoes, peppers, eggplants)

Control

DO NOT TOUCH solanaceas family plants after smoking.
Wash hands very well after smoking.
Remove and destroy infected plants immediately.
Soil ssolarization
Crop rotation 1-2 years.

