

Pests, Diseases, and Growing

Common Diseases

Strategies

Resources

About the Document

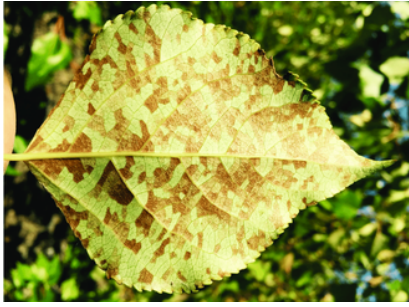
This document and manual introduces alternative ways to deal with pesky critters and common plant diseases that you may find in your garden.

Please be sure to check out our additional resource guide at the back of the document for any further readings.

Happy gardening!

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List of diseases and causes:



Bronzing

Bronzing or copper colouration occurs as a result of too much sun or an excessive amount of pollution.

Chlorosis

Nutrient deficiencies related to soil alkalinity (high pH), drought, poor drainage, and compaction of the soil.



Mosaic

Abnormal colouration of the leaves, most often with greenish/yellowish splotches. It is viral, eg. cucumber mosaic virus.

Blight

Rapid dieback of plants and foliage, which can be caused by many things, but most possibly a fungus infection. Seedlings can experience something similar called damping-off.



Ring-spot

Most commonly found in the brassica family (cabbage, broccoli, cauliflower, kale, etc.), this disease is caused by a fungal infection. The disease is most severe during cool weather when heavy dews are present.



Gall

Plant galls can be created by many different reasons, from insects, bacteria, mites, or fungus. You can remove the infected leaves by hand, but if the leaves are too numerous, it's not worth the risk of putting the plant in shock, and is better to leave them.

Etiolation (leggy plants)

Leggy plants are caused by a lack of light or poor lighting location. The plant elongates towards the light source. This can be fixed by adjusting your plants or light source.



Powdery Mildew

This fungus is commonly on many different garden plants. Overall, the impact of this disease is small, so in most cases, no action is required, but you could remove infected plant parts if desired.

Scorch

Scorch can be from a number of different things, from too much intense sunlight to over-fertilizing your plants. Whatever the reason, it will affect the leaves and in some cases, the overall health of your plant.



Integrated Pest Management (IPM)

Cultural

Predatory insects
Temperature
Sanitation
Habitat

Physical

Pruning infected parts
Barriers, screens
Removing pests
Tilling soil

Genetic

Resistant plants
Companion
planting

Behavior

Scent-deterants
Manipulate pests
with traps

Biological

Predatory insects
Nematodes
Bacteria
Fungi

Chemical

A LAST RESORT!!
Things that
end with
"cide"

What is IPM?

Integrated Pest Management is a science-based approach that combines a variety of techniques. By studying their life cycles and how pests interact with the environment, IPM professionals can manage pests with the most current methods to improve management, lower costs, and reduce risks to people and the environment.

IPM tools include:

- Alter surroundings
- Add beneficial insects/organisms
- Grow plants that resist pests
- Disrupt development of pest
- Prevention of pest problem developing
- Disrupt insect behaviors
- Use pesticides

1 IDENTIFY/ MONITOR

Determine the causal agent and its abundance (contact your local extension agent for help).

2 EVALUATE

The results from monitoring will help to answer the questions: Is the pest causing damage? Do we need to act? As pest numbers increase toward the economic threshold further treatments may be necessary.

3 PREVENT

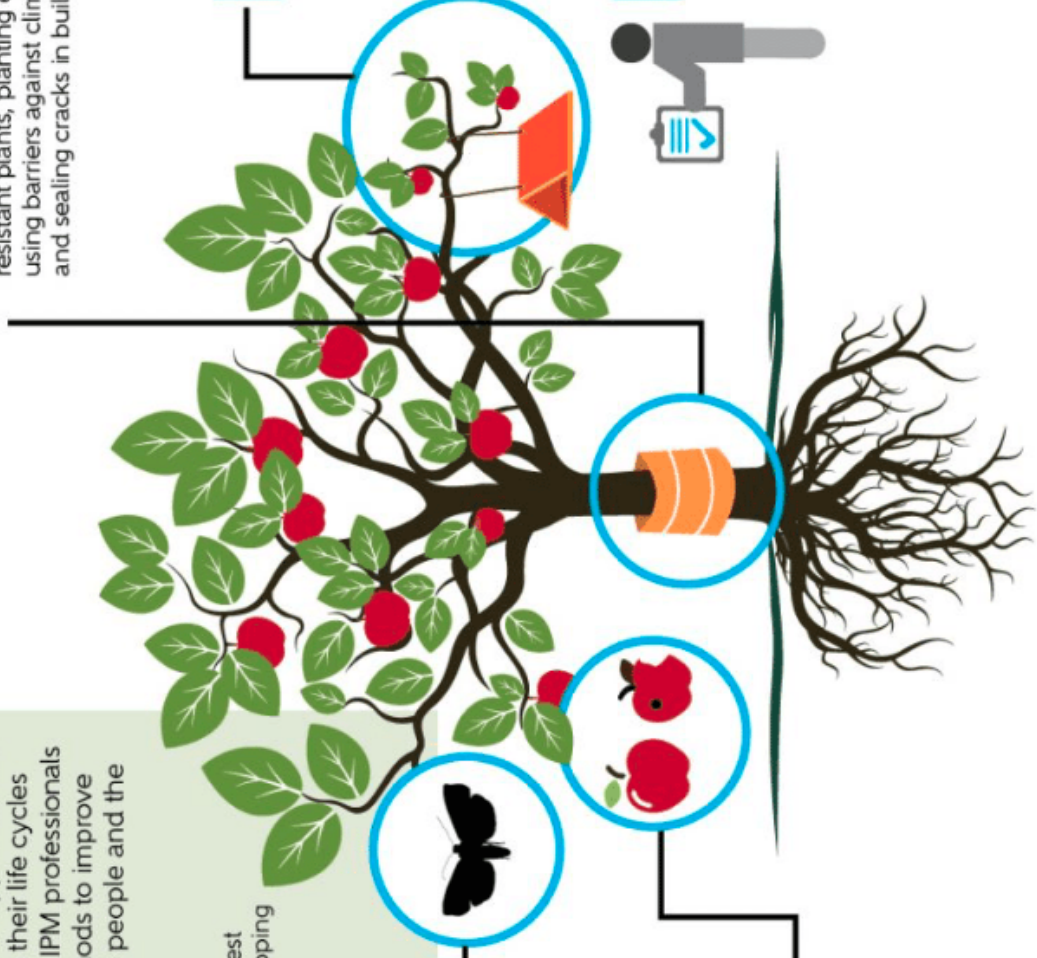
Some pest problems can be prevented by using resistant plants, planting early, rotating crops, using barriers against climbing pests, sanitation, and sealing cracks in buildings.

4 ACTION

IPM uses multiple tools to reduce pests below an economically damaging level. A careful selection of preventive and curative treatments will reduce reliance on any one tactic and increase likelihood of success.

5 MONITOR

Continue to monitor the pest population. If it remains low or decreases, further treatments may not be necessary, but if it increases and exceeds the action threshold, another IPM tool should be used.



Environmental:

Environmental management can mean a number of things, but more specifically if the methods relate to **Cultural**, **Physical**, or **Genetic** interventions. The difference and definition of all can be found below:

Cultural Control:

Cultural control refers to how you can affect how pests and diseases interact (or avoid) your growing spaces. This may include:

- Tilling or digging up the dirt before planting will disrupt any larvae or bugs hidden in the soil, exposing them to temperature, predators, and the elements.
- How much space there is between plants (the more space, the less likely it is to get an infestation).
- Planting diversity (more types of plants you have lowers the chance of pest spreading). You can also see the attached Companion Planting sheet to help when planning your garden.
- Controlling weeds and infected plant parts (pruning, removing diseased leaves, or removing an entire infected plant).
- Crop rotation (not growing the same type of plant in the same spot or soil year after year). By changing what you grow, it is harder for bugs to become established and make a home in your garden.
- Watering habits. Instead of watering lightly every day, if you water heavily every few days, the large amount of water has the ability to drown or wash out pests in the soil, while not affecting your plants.

Physical Control:

Physical methods are exactly how they sound. They are methods that affect pests and disease physically, caused by your actions through a variety of ways to prevent pests from making a home. Some examples can be listed below:

- Burning outdoor growing spaces in the late fall or early spring to destroy pests and weed seeds.
- Pruning infected or diseased plant parts off plants.
- Hand-picking insects off plants.
- Setting traps for pests (there is a greenhouse sticky-tape available that attracts flying pests like aphids and fungus gnats).
- Netting your plants. On some occasions, placing a net over your plants may help to prevent flying pests from reaching your plants.

Genetic Control:











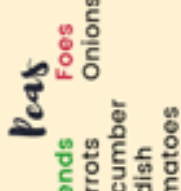
Genetic methods refer to using specific plants in order to avoid pests and diseases. Some examples are listed below:

- There are specific plant seeds you can buy that are resistant to some pests and diseases.
- Companion planting is a large factor in genetic control, as many aromatic plants (like garlic and onions) will deter pests from making a home near them.
- Please see the attached companion planting sheet for more information and examples!

Companion Planting Chart for Cultural and Genetic Control:

Companion Planting

Follow these guidelines to best structure the layout of your garden

<p>Cucumber</p> <p>Friends Beans Cabbage Lettuce Peas Radish Tomatoes</p> <p>Foes Aromatic Herbs</p> 	<p>Peppers</p> <p>Friends Eggplant Onions Tomatoes</p> <p>Foes Beans Broccoli Kale</p> 
<p>Beans</p> <p>Friends Radish Eggplant Potatoes Cucumber</p> <p>Foes Onions Peppers Garlic</p> 	<p>Potatoes</p> <p>Friends Beans Cabbage</p> <p>Foes Tomatoes</p> 
<p>Beets</p> <p>Friends Lettuce Bush Beans</p> <p>Foes Pole Beans</p> 	<p>Radishes</p> <p>Friends Peas Lettuce Cucumber Beans</p> <p>Foes Kohlrabi</p> 
<p>Broccoli</p> <p>Friends Spinach Peppers Onions</p> <p>Foes Tomatoes Squash</p> 	<p>Squash</p> <p>Friends Lettuce Broccoli Kale</p> <p>Foes None</p> 
<p>Cabbage</p> <p>Friends Potatoes Onions Lettuce Cucumber</p> <p>Foes Tomatoes</p> 	<p>Tomatoes</p> <p>Friends Cucumber Onions Peppers</p> <p>Foes Cabbage Corn Broccoli Kale Potatoes</p> 
<p>Eggplant</p> <p>Friends Beans Peppers</p> <p>Foes Fennel</p> 	<p>Kale</p> <p>Friends Onions</p> <p>Foes Peppers Tomatoes Squash</p> 
<p>Peas</p> <p>Friends Carrots Cucumber Radish Tomatoes</p> <p>Foes Onions</p> 	<p>Turnips</p> <p>Friends Peas</p> <p>Foes Eggplant</p> 
<p>Carrots</p> <p>Friends Beans Onions Lettuce Peas</p> <p>Foes Dill</p> 	<p>Lettuce</p> <p>Friends Beets Carrots Cabbage Cucumber Onions Radish Squash</p> <p>Foes None</p> 
<p>Onions</p> <p>Friends Broccoli Cabbage Carrots Kale Lettuce Peppers Tomatoes</p> <p>Foes Peas Beans</p> 	<p>Peas</p> <p>Friends Carrots Cucumber Radish Tomatoes</p> <p>Foes Onions</p> 

Biological:

Biological management can relate to a number of natural methods, including the **behaviour** of plants and insects. These methods of pest control are a bit more complicated and may require purchasing specific products. You can find more details regarding these methods below:

Biology:

Biological control refers to using nature to help you keep pests out of your garden. Some examples include:

- Encouraging beneficial bugs in your garden (like spiders, ladybugs, and wasps that will eat garden pests).
- Using fungus and bacteria sprays in order to control pest populations. These sprays include living organisms that will target the immune system of the pests.
 - B.T. Kursataki targets moths and caterpillars.
 - B.T. Israeliensis targets flies and maggots
 - B.T. San Diego targets beetles and grubs.

Behaviour:

Behaviour control uses the pest's senses against itself. Some examples include:

- Setting traps for insects like Fly Paper, or attract pests with scents.
- Scent trapping can either use common material, or you can purchase specific traps for certain insects through greenhouse suppliers.

Chemical

Chemical management should be considered a last resort in your pest management plans as it can impact your plants and the surrounding environment more than any other method.

Most pesticides are fast-acting and more dangerous to handle than other products, but below you can find a list of relatively safe products for use:

- **Insecticidal soaps** are sprayed on plants and cause soft-bodied insects to dehydrate.
- **Horticultural oils** are denser, and smother insects on contact.
- **Botanical insecticides** are made from naturally occurring toxins in plants.
- **Diatomaceous earth** is an organic ingredient found in many 'safe' pesticides that irritate and deter insects.
- **Vinegar** products are great for safely removing problem plants.
- **Microbial insecticides**, as mentioned in the Biological section, have live organisms in them like fungus spores, bacteria, and nematodes

Pesticide Safety

Always read the pesticide label and follow its directions exactly.

- You may *only* use the pesticide on sites or crops listed on the label.
- Be sure to observe all special precautions that are listed on the label.
- Wear protective clothing or equipment as listed on the label when mixing or applying pesticides.
- Mix pesticides at the rate recommended for the target site as listed on the label.
- Never use more than the label says.
- Follow all label directions for safe pesticide storage and disposal.
- Always remember to read and heed the six most important words on the label: **“KEEP OUT OF REACH OF CHILDREN.”**

Additional Resources

All the following resources were used in some way to help create this document. If you are looking for more information, these resources are available online for your convenience.

- Ecology North Website
- Home and Garden Information Center (HGIC) of Clemance University
- Ecological Agricultural Projects (EAP) Publications
- NWT Gov. Northwest Territories Growing Foreward Agreement
- The Old Farmer's Almanac Website
- Garden Stead Website

You can read the **Northern Lights Gardening Manuel** for information about

- Specific plants
- Common pests and how to deal with them
- Making organic, plant-based pesticides from scraps in your kitchen
- Recipes you can make with the vegetables you grow
- And much more!