Apple_Apple_scab:

- Apple scab is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
- Infected leaves can be burned, buried or composted.

Apple_Black_rot:

- Black rot is occasionally a problem on Minnesota apple trees.
- This fungal disease causes leaf spot, fruit rot and cankers on branches.
- Stressed by environmental factors like drought.
- Manage black rot by practicing good sanitation, taking good care of your trees and pruning your trees correctly.
- Fungicides are rarely needed to manage black rot.

Symptoms:

- Large brown rotten areas can form anywhere on the fruit but are most common on the blossom end.
- Brown to black concentric rings can often be seen on larger infections.
- The flesh of the apple is brown but remains firm.
- Small, black spots can be seen on older fruit infections. These are fungal spore producing structures, called pycnidia.
- Some fruit mummify (shrivel and dry out) and remain attached to the tree.



Prevention:

- Prune out dead or diseased branches.
- Pick all dried and shriveled fruits remaining on the trees.
- Remove infected plant material from the area.
- All infected plant parts should be burned, buried or sent to a municipal composting site.
- Be sure to remove the stumps of any apple trees you cut down. Dead stumps can be a source of spores.

Apple_Cedar_apple_rust:

Gray leaf spot is typically the most serious foliar disease of corn in the U.S. corn belt, although other diseases can be more important in areas and years where weather conditions do not favor gray leaf spot. Gray leaf spot requires extended periods of high humidity and warm conditions. It can be confused with other foliar diseases of corn.

Symptoms:

- The disease first appears in the form of small, necrotic spots with halos.
- These usually expand to become rectangular lesions, about 1/8 inch wide by up to 2 inches to 3 inches long and gray to brown in appearance.
- Mature lesions usually have distinct parallel edges and appear opaque when put up to the light, but the lesions hybrids vary widely in shape and color.
- Symptoms can sometimes be confused with northern corn leaf spot, although gray leaf spot lesions are usually limited on the sides by veins.

Prevention:

- **Resistant Varieties**: Plant corn hybrids that are resistant or tolerant to grey leaf spot. Consult local agricultural extension services for recommendations on resistant varieties suitable for your area.
- **Crop Rotation**: Rotate corn with non-host crops such as soybeans or small grains. This helps break the disease cycle by reducing the amount of fungal spores in the field.
- **Tillage Practices**: Implement tillage practices that bury infected crop residue, which is the primary source of fungal spores. This reduces the likelihood of the disease reoccurring in the next growing season.
- **Fungicide Application**: Apply fungicides if the disease pressure is high, especially during the critical growth stages (VT to R1). Fungicide effectiveness depends on timely application, so scout fields regularly to determine the need.
- **Field Sanitation**: Remove and destroy infected plant debris after harvest. This helps reduce the inoculum that could infect the next crop.

Apple_healthy:

- Your apple is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Blueberry_healthy:

- Your Blueberry is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Cherry(including_sour)Powdery_mildew:

- Late blight is a potentially devastating disease of tomato and potato, infecting leaves, stems, tomato fruit, and potato tubers.
- The disease spreads quickly in fields and can result in total crop failure if untreated.
- Late blight does not occur every year in Minnesota.
- Late blight of potato was responsible for the Irish potato famine of the late 1840s.

Symptoms:

- Leaves have large, dark brown blotches with a green gray edge; not confined by major leaf veins.
- Infections progress through leaflets and petioles, resulting in large sections of dry brown foliage.
- Stem infections are firm and dark brown with a rounded edge.
- In cool, wet weather, entire fields turn brown and wilted as if hit by frost.
- In tomatoes, firm, dark brown, circular spots grow to cover large parts of fruits. Spots may become mushy as secondary bacteria invade.



Prevention:

- Water with drip irrigation or a soaker hose.
- Water in the morning so leaves dry quickly in the sun.
- Stake or cage plants.
- Space plants so that air flows between them.
- Remove or bury plants at the end of the season. Manage cull piles so culls break down over winter.

Cherry(including_sour)healthy:

- Your Cherry is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Corn(maize)Cercospora_leaf_spot Gray_leaf_spot:

- Scorched strawberry leaves are caused by a fungal infection which affects the foliage of strawberry plantings.
- Strawberries with leaf scorch may first show signs of issue with the development of small purplish blemishes that occur on the topside of leaves.
- In severe cases, dark spots may even cover entire portions of strawberry plant leaves and cause them to completely dry and fall from the plant.

Symptoms:

- Leaf scorch symptoms are very similar to the early stages of common (*Mycosphaerella*) leaf spot, with irregular dark purple spots being scattered over the upper leaf surface.
- As the spots enlarge, they begin to look like drops of tar, and are actually the accumulations of black fruiting bodies (acervuli) of the fungus.
- The centers of the spots remain purple (in Mycosphaerella leaf spot they are white) and there is no well-defined lesion border.



Prevention:

- While leaf scorch on strawberry plants can be frustrating, there are some strategies which home gardeners may employ to help prevent its spread in the garden.
- The primary means of strawberry leaf scorch control should always be prevention.
- Since this fungal pathogen overwinters on the fallen leaves of infected plants, proper garden sanitation is key.
- This includes the removal of infected garden debris from the strawberry patch, as well as the frequent establishment of new strawberry transplants.
- The creation of new plantings and strawberry patches is key to maintaining a consistent strawberry harvest, as older plants are more likely to show signs of severe infection.

Corn(maize)Common_rust:

- Early blight is one of the most common tomato and potato diseases, occurring nearly every season in Minnesota.
- It affects leaves, fruits and stems and can be severely yield-limiting when susceptible tomato cultivars are used and weather is favorable.
- Severe defoliation can occur. In tomatoes, fruit can be damaged by sun.

Symptoms:

- Initially, small dark spots form on older foliage near the ground. Leaf spots are round, brown and can grow up to 1/2 inch in diameter.
- Larger spots have target-like concentric rings. The tissue around spots often turns yellow.
- Severely infected leaves turn brown and fall off, or dead, dried leaves may cling to the stem.
- Seedling stems are infected at or just above the soil line. The stem turns brown, sunken and dry (collar rot). If the infection girdles the stem, the seedling wilts and dies.
- Stem infections on older plants are oval to irregular, dry brown areas with dark brown concentric rings.


Prevention:

- Cover the soil under the plants with mulch, such as fabric, straw, plastic mulch, or dried leaves.
- Water at the base of each plant, using drip irrigation, a soaker hose, or careful hand watering.
- Increase airflow by staking or trellising, removing weeds, and spacing plants adequately apart
- Pruning the bottom leaves can also prevent early blight spores from splashing up from the soil onto leaves.
- Let two years pass before you plant tomatoes or peppers in the same location.

Corn(maize)Northern_Leaf_Blight:

- Bacterial spot can be a devastating disease when the weather is warm and humid.
- Four closely related bacteria cause bacterial spot: *Xanthomonas vesicatoria*, *X. euvesicatoria*, *X. gardneri*, and *X. perforans*.
- The disease can affect all above-ground parts of tomato and pepper plants: stems, petioles, leaves, and fruits.
- Fruit spots commonly result in unmarketable fruit.

Symptoms:

- When it first appears on the leaves, bacterial spot is similar in appearance to many other tomatoes diseases.
- Tomato leaves have small (less than 1/8 inch), brown, circular spots surrounded by a yellow halo.
- The center of the leaf spots often falls out resulting in small holes.
- The leaf spots do not contain concentric rings, spots with concentric rings are likely caused by early blight.
- Pepper leaves have small (less than 1/8 inch), brown, circular spots that do not have a yellow halo and centers do not fall out.



Prevention of Gray Leaf Spot

- Purchase high quality, certified disease-free seed if possible.
- Hot water treatment can be used to kill bacteria on and in seed.
- For growers producing their own seedlings, avoid over-watering and handle plants as little as possible. Disinfect greenhouses, tools, and equipment between seedling crops with a commercial sanitizer.
- For growers purchasing transplants, buy plants from reputable growers who start with clean seed and use good cultural practices to reduce disease.
- Space plants adequately. Space tomato plants 14-16 inches apart for single leader high tunnel tomatoes that are heavily pruned. Space plants 18-24 inches if tomatoes are grown in cages or pruned less intensively.

Corn(maize)healthy:

- Your corn is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Grape_Black_rot:

- There are more than a dozen viruses that can infect tomatoes.
- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
- Leaves may be curled, malformed, or reduced in size.
- Spots of dead leaf tissue may become apparent with certain varieties at warm temperatures.
- Fruits may ripen unevenly.



Prevention:

- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
- There are numerous tomato varieties that are resistant to one or the other of the viruses. These are usually denoted in seed catalogs, often with the code ToMV after the variety name if resistant to tomato mosaic virus and TMV if resistant to tobacco mosaic virus.
- There are only a few varieties that are resistant to both viruses.
- Several popular rootstocks for grafted tomatoes can also confer resistance to varieties that may not normally be resistant.
- An extensive list of resistant tomato varieties can be found on the Cornell University.

Grape_Leaf_blight(Isariopsis_Leaf_Spot):

- There are more than a dozen viruses that can infect tomatoes.
- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
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Prevention:

- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
- There are numerous tomato varieties that are resistant to one or the other of the viruses. These are usually denoted in seed catalogs, often with the code ToMV after the variety name if resistant to tomato mosaic virus and TMV if resistant to tobacco mosaic virus.
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- Several popular rootstocks for grafted tomatoes can also confer resistance to varieties that may not normally be resistant.
- An extensive list of resistant tomato varieties can be found on the Cornell University.

Orange_Haunglongbing(Citrus_greening):

- Bacterial spot can be a devastating disease when the weather is warm and humid.
- Four closely related bacteria cause bacterial spot: *Xanthomonas vesicatoria*, *X. euvesicatoria*, *X. gardneri*, and *X. perforans*.
- The disease can affect all above-ground parts of tomato and pepper plants: stems, petioles, leaves, and fruits.
- Fruit spots commonly result in unmarketable fruit.

Symptoms:

- When it first appears on the leaves, bacterial spot is similar in appearance to many other tomatoes diseases.
- Tomato leaves have small (less than 1/8 inch), brown, circular spots surrounded by a yellow halo.
- The center of the leaf spots often falls out resulting in small holes.
- The leaf spots do not contain concentric rings, spots with concentric rings are likely caused by early blight.
- Pepper leaves have small (less than 1/8 inch), brown, circular spots that do not have a yellow halo and centers do not fall out.



Prevention of Gray Leaf Spot

- Purchase high quality, certified disease-free seed if possible.
- Hot water treatment can be used to kill bacteria on and in seed.
- For growers producing their own seedlings, avoid over-watering and handle plants as little as possible. Disinfect greenhouses, tools, and equipment between seedling crops with a commercial sanitizer.
- For growers purchasing transplants, buy plants from reputable growers who start with clean seed and use good cultural practices to reduce disease.
- Space plants adequately. Space tomato plants 14-16 inches apart for single leader high tunnel tomatoes that are heavily pruned. Space plants 18-24 inches if tomatoes are grown in cages or pruned less intensively.

PeachBacterial_spot:

- Scorched strawberry leaves are caused by a fungal infection which affects the foliage of strawberry plantings.
- Strawberries with leaf scorch may first show signs of issue with the development of small purplish blemishes that occur on the topside of leaves.
- In severe cases, dark spots may even cover entire portions of strawberry plant leaves and cause them to completely dry and fall from the plant.

Symptoms:

- Leaf scorch symptoms are very similar to the early stages of common (*Mycosphaerella*) leaf spot, with irregular dark purple spots being scattered over the upper leaf surface.
- As the spots enlarge, they begin to look like drops of tar, and are actually the accumulations of black fruiting bodies (acervuli) of the fungus.
- The centers of the spots remain purple (in Mycosphaerella leaf spot they are white) and there is no well-defined lesion border.



Prevention:

- While leaf scorch on strawberry plants can be frustrating, there are some strategies which home gardeners may employ to help prevent its spread in the garden.
- The primary means of strawberry leaf scorch control should always be prevention.
- Since this fungal pathogen overwinters on the fallen leaves of infected plants, proper garden sanitation is key.
- This includes the removal of infected garden debris from the strawberry patch, as well as the frequent establishment of new strawberry transplants.
- The creation of new plantings and strawberry patches is key to maintaining a consistent strawberry harvest, as older plants are more likely to show signs of severe infection.

Pepper,_bell_Bacterial_spot:

- Apple scab is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
- Infected leaves can be burned, buried or composted.

Pepper,_bell_healthy:

- Your Pepper Bell is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Potato_Early_blight:

- Tomato leaf mold is typically only an issue in greenhouse and high-tunnel tomatoes.
- The disease is driven by high relative humidity (greater than 85%).
- Foliage is often the only part of the plant directly infected. Infection will cause infected leaves to wither and die, indirectly affecting yield.
- In severe cases, blossoms and fruit can also be infected, directly reducing yield.
- Leaf mold is caused by the fungus *Passalora fulva* (previously called *Fulvia fulva* or *Cladosporium fulvum*).

Symptoms:

- The oldest leaves are infected first.
- Pale greenish-yellow spots, usually less than 1/4 inch, with no definite margins, form on the upper sides of leaves.
- Olive-green to brown velvety mold forms on the lower leaf surface below leaf spots.
- Leaf spots grow together and turn brown. Leaves wither and die but often remain attached to the plant.
- Infected blossoms turn black and fall off.



Prevention:

- The pathogen *P. fulfa* can survive on infected plant debris or in the soil, although the initial source of the disease is often infected seed.
- The disease is spread by rain and wind, on tools and clothing, and via insect activity.
- High relative humidity (greater that 85%) combined with high temperatures encourages the spread of the disease.
- With that in mind, if growing tomatoes in a greenhouse, maintain night temps higher than outside temperatures.
- When planting, use only certified disease-free seed or treated seed.
- Remove and destroy all crop debris post-harvest.
- Sanitize the greenhouse between crop seasons.

Potato_Late_blight:

- There are more than a dozen viruses that can infect tomatoes.
- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
- Leaves may be curled, malformed, or reduced in size.
- Spots of dead leaf tissue may become apparent with certain varieties at warm temperatures.
- Fruits may ripen unevenly.



Prevention:

- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
- There are numerous tomato varieties that are resistant to one or the other of the viruses. These are usually denoted in seed catalogs, often with the code ToMV after the variety name if resistant to tomato mosaic virus and TMV if resistant to tobacco mosaic virus.
- There are only a few varieties that are resistant to both viruses.
- Several popular rootstocks for grafted tomatoes can also confer resistance to varieties that may not normally be resistant.
- An extensive list of resistant tomato varieties can be found on the Cornell University.

Potato_healthy:

- Your potato is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Soybean_healthy:

- Your Soyabean is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Squash_Powdery_mildew:

- Powdery mildew infections are caused by several different species of fungus.
- Each species has its own preferred host plants.
- The species of powdery mildew that affects squash foliage (*Erysiphe cichoracearum*) is different from those that target peas (*Erysiphe pisi*) or eggplants (*Leveillula taurica*).
- Interestingly, this fungus lives on the outside of the leaves and does not penetrate the interior tissue.
- It can only grow on the surface of the leaf.

Symptoms:

- The first sign of powdery mildew on squash are small, white, dusty spots on the young leaves.
- Initially, there will only be a few spots, but it spreads quickly, eventually covering the entire leaf surface.
- Powdery mildew is most commonly seen on the top of the leaves, but it can also appear on the leaf undersides, the stems, and even on the fruits.



Prevention :

- Provide good air circulation by spacing squash plants several feet apart.
- Don’t touch infected leaves and then touch healthy leaves. You’ve just spread spores!
- Always plant squash in the full sun. Shady conditions are more humid and that encourages spore germination.
- Cut off any leaves that show early signs of infection ASAP. Toss them in the garbage or burn pile. Keep them out of the compost pile.
- Do not apply nitrogen fertilizer in the middle of the growing season. Doing so causes a flush of new growth which is more prone to the disease.

Strawberry_Leaf_scorch:

- Apple scab is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
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Strawberry_healthy:

- Your Strawberry is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Tomato_Bacterial_spot:

- Bacterial spot can be a devastating disease when the weather is warm and humid.
- Four closely related bacteria cause bacterial spot: *Xanthomonas vesicatoria*, *X. euvesicatoria*, *X. gardneri*, and *X. perforans*.
- The disease can affect all above-ground parts of tomato and pepper plants: stems, petioles, leaves, and fruits.
- Fruit spots commonly result in unmarketable fruit.

Symptoms:

- When it first appears on the leaves, bacterial spot is similar in appearance to many other tomatoes diseases.
- Tomato leaves have small (less than 1/8 inch), brown, circular spots surrounded by a yellow halo.
- The center of the leaf spots often falls out resulting in small holes.
- The leaf spots do not contain concentric rings, spots with concentric rings are likely caused by early blight.
- Pepper leaves have small (less than 1/8 inch), brown, circular spots that do not have a yellow halo and centers do not fall out.



Prevention of Gray Leaf Spot

- Purchase high quality, certified disease-free seed if possible.
- Hot water treatment can be used to kill bacteria on and in seed.
- For growers producing their own seedlings, avoid over-watering and handle plants as little as possible. Disinfect greenhouses, tools, and equipment between seedling crops with a commercial sanitizer.
- For growers purchasing transplants, buy plants from reputable growers who start with clean seed and use good cultural practices to reduce disease.
- Space plants adequately. Space tomato plants 14-16 inches apart for single leader high tunnel tomatoes that are heavily pruned. Space plants 18-24 inches if tomatoes are grown in cages or pruned less intensively.

Tomato_Early_blight:

- Tomato leaf mold is typically only an issue in greenhouse and high-tunnel tomatoes.
- The disease is driven by high relative humidity (greater than 85%).
- Foliage is often the only part of the plant directly infected. Infection will cause infected leaves to wither and die, indirectly affecting yield.
- In severe cases, blossoms and fruit can also be infected, directly reducing yield.
- Leaf mold is caused by the fungus *Passalora fulva* (previously called *Fulvia fulva* or *Cladosporium fulvum*).

Symptoms:

- The oldest leaves are infected first.
- Pale greenish-yellow spots, usually less than 1/4 inch, with no definite margins, form on the upper sides of leaves.
- Olive-green to brown velvety mold forms on the lower leaf surface below leaf spots.
- Leaf spots grow together and turn brown. Leaves wither and die but often remain attached to the plant.
- Infected blossoms turn black and fall off.



Prevention:

- The pathogen *P. fulfa* can survive on infected plant debris or in the soil, although the initial source of the disease is often infected seed.
- The disease is spread by rain and wind, on tools and clothing, and via insect activity.
- High relative humidity (greater that 85%) combined with high temperatures encourages the spread of the disease.
- With that in mind, if growing tomatoes in a greenhouse, maintain night temps higher than outside temperatures.
- When planting, use only certified disease-free seed or treated seed.
- Remove and destroy all crop debris post-harvest.
- Sanitize the greenhouse between crop seasons.

Tomato_Late_blight:

- There are more than a dozen viruses that can infect tomatoes.
- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
- Leaves may be curled, malformed, or reduced in size.
- Spots of dead leaf tissue may become apparent with certain varieties at warm temperatures.
- Fruits may ripen unevenly.



Prevention:

- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
- There are numerous tomato varieties that are resistant to one or the other of the viruses. These are usually denoted in seed catalogs, often with the code ToMV after the variety name if resistant to tomato mosaic virus and TMV if resistant to tobacco mosaic virus.
- There are only a few varieties that are resistant to both viruses.
- Several popular rootstocks for grafted tomatoes can also confer resistance to varieties that may not normally be resistant.
- An extensive list of resistant tomato varieties can be found on the Cornell University.

Tomato_Leaf_Mold:

- Tomato is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
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Tomato_Septoria_leaf_spot:

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- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
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- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
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Tomato_Spider_mites Two-spotted_spider_mite:

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- The most common viruses in Minnesota are tomato mosaic virus (ToMV) and tobacco mosaic virus (TMV).
- Viruses can cause foliar and fruit symptoms.
- Plant viruses can only be identified by lab testing.
- There is no cure for plant viruses, management actions should be focused on preventing virus spread.

Symptoms:

- If plants are infected early, they may appear yellow and stunted overall.
- Mottled light and dark green on leaves.
- Leaves may be curled, malformed, or reduced in size.
- Spots of dead leaf tissue may become apparent with certain varieties at warm temperatures.
- Fruits may ripen unevenly.



Prevention:

- Scout plants regularly. If plants displaying symptoms of viruses are found, remove the entire plant (including roots), bag the plant, and send it to the University of Minnesota Plant Disease Clinic for diagnosis.
- There are numerous tomato varieties that are resistant to one or the other of the viruses. These are usually denoted in seed catalogs, often with the code ToMV after the variety name if resistant to tomato mosaic virus and TMV if resistant to tobacco mosaic virus.
- There are only a few varieties that are resistant to both viruses.
- Several popular rootstocks for grafted tomatoes can also confer resistance to varieties that may not normally be resistant.
- An extensive list of resistant tomato varieties can be found on the Cornell University.

Tomato_Target_Spot:

- Tomato is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
- Infected leaves can be burned, buried or composted.

Tomato_Tomato_Yellow_Leaf_Curl_Virus:

- Tomato leaf mold is typically only an issue in greenhouse and high-tunnel tomatoes.
- The disease is driven by high relative humidity (greater than 85%).
- Foliage is often the only part of the plant directly infected. Infection will cause infected leaves to wither and die, indirectly affecting yield.
- In severe cases, blossoms and fruit can also be infected, directly reducing yield.
- Leaf mold is caused by the fungus *Passalora fulva* (previously called *Fulvia fulva* or *Cladosporium fulvum*).

Symptoms:

- The oldest leaves are infected first.
- Pale greenish-yellow spots, usually less than 1/4 inch, with no definite margins, form on the upper sides of leaves.
- Olive-green to brown velvety mold forms on the lower leaf surface below leaf spots.
- Leaf spots grow together and turn brown. Leaves wither and die but often remain attached to the plant.
- Infected blossoms turn black and fall off.



Prevention:

- The pathogen *P. fulfa* can survive on infected plant debris or in the soil, although the initial source of the disease is often infected seed.
- The disease is spread by rain and wind, on tools and clothing, and via insect activity.
- High relative humidity (greater that 85%) combined with high temperatures encourages the spread of the disease.
- With that in mind, if growing tomatoes in a greenhouse, maintain night temps higher than outside temperatures.
- When planting, use only certified disease-free seed or treated seed.
- Remove and destroy all crop debris post-harvest.
- Sanitize the greenhouse between crop seasons.

Tomato_Tomato_mosaic_virus:

- Tomato is the most common disease of apple and crabapple trees in Minnesota.
- Scab is caused by a fungus that infects both leaves and fruit.
- Scabby fruit are often unfit for eating.
- Infected leaves have olive-green to brown spots.
- Leaf loss weakens the tree when it occurs many years in a row.

Symptoms:

- Leaf spots are round, olive-green, and up to 1/2 inch across.
- Spots are velvet-like with fringed borders.
- Fruit that are infected when very young become deformed and cracked as the fruit grows.
- Leaves with many leaf spots turn yellow and drop by mid-summer.
- Infected fruit have olive-green spots that turn brown and corky with time.



Prevention:

- Remove fallen leaves to remove places where the fungus can survive the winter.
- Even with a good fall leaf cleanup, spores from nearby apple trees can travel to your property, starting the infection cycle again.
- Rake up and destroy fallen leaves before the first snowfall.
- Infected leaves can be burned, buried or composted.
- Infected leaves can be burned, buried or composted.

Tomato_healthy:

- Your Tomato is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Grape_Esca(Black_Measles):

- Powdery mildew infections are caused by several different species of fungus.
- Each species has its own preferred host plants.
- The species of powdery mildew that affects squash foliage (*Erysiphe cichoracearum*) is different from those that target peas (*Erysiphe pisi*) or eggplants (*Leveillula taurica*).
- Interestingly, this fungus lives on the outside of the leaves and does not penetrate the interior tissue.
- It can only grow on the surface of the leaf.

Symptoms:

- The first sign of powdery mildew on squash are small, white, dusty spots on the young leaves.
- Initially, there will only be a few spots, but it spreads quickly, eventually covering the entire leaf surface.
- Powdery mildew is most commonly seen on the top of the leaves, but it can also appear on the leaf undersides, the stems, and even on the fruits.



Prevention :

- Provide good air circulation by spacing squash plants several feet apart.
- Don’t touch infected leaves and then touch healthy leaves. You’ve just spread spores!
- Always plant squash in the full sun. Shady conditions are more humid and that encourages spore germination.
- Cut off any leaves that show early signs of infection ASAP. Toss them in the garbage or burn pile. Keep them out of the compost pile.
- Do not apply nitrogen fertilizer in the middle of the growing season. Doing so causes a flush of new growth which is more prone to the disease.

Grapehealthy:

- Your Grape is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Peach_healthy:

- Your Peach is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.

Raspberry_healthy:

- Your Raspberry is in great health! It is showing no signs of illness or distress and is thriving in her environment.
- Her feathers are smooth and shiny, her appetite is good, and she’s active and alert.
- Regularly monitor her health and keep up with vaccinations to ensure she stays happy and healthy.