



Identifying Plant Disorders by Causal Agent

One method of identifying what is wrong with your plant is to identify the **Casual Agent**. The causal agent is any entity (cultural, manmade, nutrition, insect or pathogen) that produces an effect or is responsible for causing a disorder in the plant. In other words, the casual agent is the reason why your plant is sick.

Below I have listed the most common disorders found in plants listed by their casual agent. Observe closely that the same symptom or sign can appear for more than one disorder. It is important when trying to diagnose a disorder to gather as much information about the affected plant and its environmental surroundings to be able to pinpoint the real casual agent.

If your plant is displaying some symptoms or signs of disorders, start with watering which is the most common cause of disorders in plants. Review the signs, recent events (rains, drought, etc.), soil conditions, and your watering practices to determine if water is the possible cause for your disorder. If you decide that it isn't the casual agent, move on to Exposure and so forth down the list until you narrow the possible cause.

1. Over or under watering

When the soil dries out, salt builds up in the soil, burning the tips of plants. At the same time, too much water will drown the plants roots and cause almost exactly the same signs and symptoms. Consistent watering is very important for maintaining plant and soil health. Verify that pots have good drainage holes and that the soil is not compacted and has too much sand

Signs of under watering

- Wilting
- Burned leaf tips (salt built-up)
- Yellow or brown leaves
- Leaf drop (abscission)
- Shallow root system

Causal Agents of overwatering/under watering

- Pots with poor drainage
- Soil too sandy or compact
- Too much rain or irrigation
- Soluble salts build up

Signs of overwatering

- Burned leaf tips
- Yellow or brown leaves
- Leaf drop (abscission)
- Dark or mushy roots or stems (root rot)
- Soil is soggy, standing water
- Algae or Fungus Gnats

2. Exposure (usually to low)

Plants need either direct sunlight or diffused light (as through a sheer curtain), but the quality and quantity of each may vary, depending on the type of plant. Before buying a plant, be sure you understand its light needs so you can place it appropriately in your home

Signs of Exposure- Too Little

- Etiolation- scraggly and spindly growth with extended leaf internodes



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- Leaning- towards natural light
- Leaf color becomes pale and dull
- Leaf or bud drop
- Stunted or slow growth of plant
- Leaves unusually small and thin
- Yellowing of leaves (Chlorosis)
- No blooms (flowering plants)

Causal Agents of bad Exposure

- Plant not close enough to window or door to receive required hours of light
- Sudden change from too much light to not enough or vice versa
- Plant too close to window (extreme heat)
- Plant in wrong location (ex. House plant placed outdoors)

Signs of Exposure- Too much

- Sunburn- Leaves have brown spots surrounded by yellow halos
- Wilting
- Leaves turn pale and develop yellowish spots or streaks
- Leaf drop (abscission)
- Stunted growth

3. Air – too dry or drafts

Homes with central heating are dry during fall and winter. The same is true in summer of houses where the air conditioner runs a lot. Make sure to never place a plant near air conditioning vent

Signs of low humidity

- Brown and dry tips on leaves
- Leaf drop
- Wilting
- Curled leaves
- Flower buds turn brown and drop
- Slow growth- plant is abnormally small
- Mold

Causal Agents of low Humidity & drafts

- Heaters and Air conditioning
- Plant located near an area that is too windy
- Plant located under A/C vents
- Loss of moisture- evaporation

Signs of draft or wind damage

- Flopping
- Leaves shredded or broken, snapped
- Wilting

4. Sudden changes

Don't move your plants around a lot. Transferring plants from one location to another causes them to shock. Very common cause when plants are recently purchased.

Signs of transfer shock from location changes

- Wilting
- Leaf discoloration and drop
- Leaf yellowing, rolling or curling

Causal Agents of transfer shock

- Root stress
- Water stress- improper adjustment to change
- Improper planting
- Improper location for plant

Signs of transfer shock from indoor to outdoor

- Leaf scorch along veins and margins
- Plant growth reduced and shorten leaf nodes
- New leaves smaller than normal



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5. Ambient temperature too hot

The definition of ambient temperature is the **temperature** of the surrounding **environment** in this case, the room where the plant is situated

Signs of ambient temperatures too hot

- New growth wilts
- Plants have a dry feel
- Leaves turn black and drop
- Browning edges and tips (older leaves)
- Sunburn or scorched appearance

Causes of high ambient temperatures

- Room is too hot or too bright
- Poor air circulation on hot days
- Poor insulation of room

6. Root or pot bound

Healthy growth will cause a plant to develop a root system that is too big for its container. The plant will find itself confined and development will slow down until the plant begins to deteriorate

Signs of root or pot bound plants

- Quickly wilts
- Yellow or brown leaves develop (older growth)
- Leaf drop (older)
- Container breaks or gets out of shape
- Little water holding capacity (not enough soil)

Causal Agents of root bound plants

- Pot or area too small for plant root ball
- Plant has been too long in pot
- Overcrowding of plants in one area

7. Pests or Insects

Disorders caused by pests or insects are usually identified by the type of damage displayed on the plant. There are three groups of insect categorized by their feeding methods

- Chewing Insects- As the word implies, these insects chew (eat) the leaves of plants
- Piercing or Sucking- These insect feed by piercing the leaf and sucking out the chlorophyll
- Mining/Boring- These insects live and feed in between the epidermal layers of the leaf

Most common signs of Pests or Insect presence

- Visible observation- Insect is visible to the eye or under field lenses
- Visible damage- Chewed leaves, holes, deformity, curled leaves, ragged edges
- Abscission-lower leaf drop
- Distortion of leaf- curled, crinkled
- Sooty Mold- Definite sign of piercing type insects present



Damage symptoms based on insect feeding methods

Chewing Insects

- Free feeding
- Skeletonizing
- Notching
- Shot-hole
- Window feeding

Piercing/Sucking Insects

- Stippling
- Distortion
- Deformity
- Sooty mold
- Webbing
- Thinning
- Dieback

Mining/Borer (separate from Chewing)

- Linear mining
- Serpentine mining
- Blotch mining
- Digitate



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Most Common House plant Insects

- Aphids..... Type: Piercing/Sucking

- Also called common plant lice, these insects are up to 1/8 inch long and can be green, red, black, or brown. They occur mostly on new growing tips and undersides of leaves. By sucking the plant juices, they cause the foliage to yellow and die. They also secrete a honeydew that leaves surfaces below the plant sticky (sooty mold)



- Fungus Gnats..... Type: Nuisance

- Fungus gnats are small flies that infest soil, potting mix, other container media, and other sources of organic decomposition. They are extremely small 1/26", dark and delicate-looking flies similar in appearance to mosquitoes. Adult fungus gnats don't damage plants or bite people; their presence is primarily considered a nuisance.



- Mealybugs..... Type: Piercing/Sucking

- Mealybugs have soft, 1/4-inch-long bodies and a coating of white, powdery wax. They look like cotton balls clustered under leaves, in stem crotches, and on top of shaded leaves. They suck out plant juices and can kill plants



- Scale..... Type: Piercing/Sucking

- Scales are oval or round, 1/8-inch-long insects with a shell-like covering. Colors are generally brown, black, gray, or white. Scales deposit sticky, shiny honeydew on leaves. They suck plant juices and can cause plant death.



- Mites..... Type: Piercing/Sucking

- Spider mites are so tiny they can barely be seen. You will notice yellow flecks or speckling on the upper side of the leaves, an overall dull look to the foliage, and fine webbing (where colonies are large)





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- Whitefly.....
 - These white insects fly off the plants when disturbed and look like flying dandruff. They suck plant juices, turning foliage yellow. If untreated, whiteflies will eventually kill the plant.

Type: Piercing/Sucking



8. Diseases

Diseases are caused by biotic (living) organisms. The most common plant diseases are caused by fungi, bacteria, or viruses. Most plant diseases – around 85 percent – are caused by fungal or fungal-like organisms. Diseases are diagnosed by their symptoms since the pathogen can only be identified under a microscope in the lab.

Signs of a disease or pathogen

- Leaf spot
- Wilting (abnormal)
- Mycelia/Spores
- Brown/Squishy/Mush stems or roots
- Bacterial Streaming



Symptoms of Fungi

- Leaf Spots
 - No rings
 - Not water soaked
 - Tan, brown or black
- Leaf spots round
- Mycelia/Spores/Rust
- Rots are dry



Symptoms of Bacteria

- Leaf spot
 - Yellow ring margin
 - Water soaked
 - Brown or black
- Spots start at leaf edge
- No signs visible to detection
- Rots are wet and sticky



Symptoms of a Virus

- No visible signs to detection
- Mosaic leaf pattern
- Stunted leaves and plant
- Crinkled, deformed leaf





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9. Nutrition

Plants need the right combination of nutrients to live, grow and reproduce. When plants suffer from malnutrition, they show symptoms of being unhealthy.

Signs of Nutritional disorders

- Foliar Discoloration
- Necrosis- Leaf tips
- Distortion- Leaf
- Distortion- Plant
- Stunting/Frizzle/Distortion

Location on Plant	
Old Growth (lower)	New Growth (upper)
Nitrogen	Iron
Phosphorous	Manganese
Potassium	Boron
Magnesium	Calcium

Major Elements

Nitrogen

- Uniform Chlorosis- entire leaf
- Leaf drop
- Growth slowed down

Phosphorous

Potassium

- Chlorosis- Interveinal
- Flecking

Minors Elements

Magnesium

- Chlorotic bands along margins
- No necrosis with Mg deficiency

Iron

- Chlorosis- Interveinal
- No visible deformity
- Leaf curl-
- Leaf drop

Manganese

- Necrotic streaks on leaf
- Fizzle tops

Minors- Non-mobile

- Boron
- Calcium

