From blight on tomatoes to brown rot on peaches, food gardeners are all too familiar with how fungal diseases can affect the production and appearance of their plants. In the squash patch, a disease known as powdery mildew is often our biggest enemy. Whether you are growing summer or winter squash varieties, learning how to identify and control powdery mildew can lead to healthier, more productive plants. This article offers tips for identifying and preventing powdery mildew on squash, as well as a list of resistant varieties. You'll also find details about organic spray products you can use to manage this disease in your garden.

Powdery mildew is one of the most common diseases in the vegetable garden.

What is 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.

Regardless of which plant is being attacked by which species, the appearance of powdery mildew is the same. It is one of the most common plant diseases, and because its appearance is so distinct, it's fairly easy to identify. Powdery mildew makes the leaves look like they've been dusted with talcum powder. The mildew is white to gray. Most of that white dust consists of spores which are easily carried by wind to other nearby leaves.

Even though the species of powdery mildew that affects these pea plants is different than the one that attacks squash, all powdery mildews appear as a white, dusty powder on the leaves.

Eventually, if left untreated, powdery mildew will form teeny tiny round structures that turn brown and eventually black. These structures are what produce the "resting spores" that allow the disease to overwinter in the garden.

The last stage of powdery mildew infection turns the squash leaves yellow and crispy, causing them to shrivel up and die.

Conditions that encourage squash powdery mildew

Unlike many other fungal diseases, powdery mildew does not need moist or wet conditions to set up shop in your garden; it does just fine in warm, dry weather. This trait makes it a challenge even during dry growing seasons when blight, white mold, and other diseases typically aren't a problem. The spores of powdery mildew can arrive in your garden via the wind, infected plants from the nursery, "dirty" tools, splashing raindrops, human hands, and from spores that overwinter in the garden on infected plant debris.

Even though this fungus thrives in dry, warm conditions, in order for powdery mildew spores to take hold, there needs to be high humidity. This means that crowded squash plants with poor air circulation are more likely to be plagued by powdery mildew. Young growth is more prone to developing powdery mildew than older leaves, which is why you often see signs on the youngest leaves first.

Crowded squash plants with poor air circulation are more likely to develop a powdery mildew infection.

Early signs of disease on squash leaves

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.

Early signs of powdery mildew are small, random patches of white “dust” on the upper leaf surface.

How to tell powdery mildew from natural leaf markings

Some varieties of squash naturally have white markings on the leaves. This makes it difficult to tell whether the presence of white spots is merely a physical trait of that variety or the start of a powdery mildew infection. The easiest way to tell is to look at the patterns of the white splotches. If

they are somewhat uniformly positioned on the leaf in between the leaf veins, it's probably a natural physical trait of that variety. If the splotches are irregular and randomly placed, it's probably powdery mildew.

You can also lightly wipe the spots with your fingertip. If there is dust that easily rubs off, it's mildew. If not, it's part of the leaf. (Wash your hands after doing this so you don't inadvertently spread the spores to another leaf!)

Some varieties of squash naturally have white spots on their leaves. Be sure what you are seeing is powdery mildew and not a trait of that variety.

How the fungus affects squash plants

The good news is that since these fungi live on the leaf surface and aren't capable of entering the leaf tissue itself, powdery mildew is largely an aesthetic issue (meaning it makes the plants look not-

so-good). However, a heavy layer of powdery mildew on squash leaves does affect their ability to photosynthesize and can, over time, affect the plant's productivity and reduce yields. When severe, it will cause leaves to shrivel and die. These dead leaves can develop rot that can quickly spread to the crown of the plant.

Powdery mildew on squash also can affect the plants resistance to other pests and diseases. When weakened by the disease, squash plants are more prone to issues with squash bugs, vine borers, botrytis, and other pests and diseases.

The spots of powdery mildew on this young leaf are starting to expand. Removing the leaf entirely will keep the spores from spreading.

How to prevent powdery mildew on squash

Prevention is very important when it comes to powdery mildew on squash. Do whatever you can, as early as you can, to keep it from establishing in your garden.

Here are a few important powdery mildew prevention tips:

1. Provide good air circulation by spacing squash plants several feet apart.
2. Don't touch infected leaves and then touch healthy leaves. You've just spread spores!
3. Always plant squash in the full sun. Shady conditions are more humid and that encourages spore germination.
4. 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.

5. 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.
6. Remove and destroy all infected plants at the end of the growing season to get rid of as many spores as possible. Do not compost them; throw them in the garbage, or bury or burn them.
7. Prune out half of the leaves from each plant early in the season to reduce the humidity level around the plant and limit the chances of infection.
8. There is some evidence that milk sprays may help prevent powdery mildew, but they also may increase the chance of developing other fungal diseases. Plus, as they break down, they produce a very sour smell.
9. PLANT RESISTANT VARIETIES (more on this in the next section).

As the disease progresses, squash leaves can develop yellow spots that eventually turn brown and crunchy. Infected plants are also weakened and more prone to attacks from insect pests.

Before we introduce our favorite mildew-resistant squash, watch this short video with more info about identifying and managing this disease:

Squash varieties resistant to powdery mildew

Your first line of defense in the squash patch is to always plant varieties with a known resistance to powdery mildew. This just makes good sense. If you never develop the infection in the first place, you'll never have to worry about controlling it.

Thankfully, plant breeders have recognized how problematic powdery mildew is for gardeners and farmers, so there are plenty of powdery mildew resistant squash varieties out there. In seed catalogs, look for the code PM in each variety's description. This is the code for powdery mildew resistance. Here are some of my favorites:

Summer squash varieties resistant to powdery mildew

- 'Delta' – yellow crookneck
- 'Yellowfin' – yellow straight
- 'Smooth Operator' – yellow straight
- 'Mexicana' – light green straight
- 'Emerald Delight' – dark green straight
- 'Cash Machine' – medium green straight
- 'Astia' – compact plant; medium green straight
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Winter squash varieties resistant to powdery mildew

- 'Autumn Frost' – specialty butternut
- 'Butterbaby' – small butternut
- 'Havana' – butternut
- 'Goldilocks' – yellow acorn
- 'Honey Bear' – compact acorn
- 'Sugarbush' – compact acorn
- 'Bush Delicata' – delicata-type

Spray products

If you feel this disease is affecting the production, yield, or aesthetics of your squash plants in a negative way, you can step in with a product control. Though all of the products I recommend below are organic and far more environmentally friendly than most synthetic chemical-based fungicides, they still should be used with care. Follow all label instructions and protect yourself appropriately. Do not spray when pollinators are active and be smart about using them only when necessary.

If prevention doesn't work, there are several organic products for controlling powdery mildew on squash plants.

The Cornell mixture

Researchers at Cornell University have found that combining baking soda (sodium bicarbonate) with lightweight horticultural oil prevents and combats powdery mildew on squash and other plants. To make the Cornell mixture, blend 1 tablespoon of baking soda with 2 ½ tablespoons of horticultural oil (I like All Seasons brand) with 1 gallon of water in a pump sprayer. Spray every 14 days. Best used as a preventative.

Bacillus subtilis and B. amyloliquefaciens

These biological fungicides use a naturally occurring bacterium often found in soils to combat powdery mildew on squash. In other words, they use one living organism to manage another living organism. Fungicides based on *B. subtilis* and *B. amyloliquefaciens* are very useful and effective against powdery mildew. There are several different brand names; among the most common are Monterey Complete Disease Control and Revitalize.

Neem oil

Extracted from the seeds and fruits of the tropical neem tree, neem oil is often used as a pesticide. However, neem oil is also an effective fungicide against powdery mildew on squash. It's best used as a preventative, before powdery mildew becomes severe. Common brands include Monterey Neem Oil and Garden Safe Neem Oil. Use caution when applying neem-based products as they are slightly toxic to fish and other aquatic life. Don't spray when bees are active.

A bit of powdery mildew on your squash isn’t the end of the world. Just try your best to manage it and keep it from spreading.

Curing powdery mildew

Unfortunately, there is no complete cure for powdery mildew on squash or any other plant. Thankfully, you’ll still be able to harvest plenty of squash, even when powdery mildew is present in your garden. Your first line of defense is to always plant resistant varieties. Follow the prevention techniques outlined above, and use products only as a last resort. Even with powdery mildew in your garden, you’ll likely still be blessed with plenty of zucchini to share with your neighbors