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The challenge of fungal diseases in garlic

Garlic is subject to numerous diseases that cause reduced yields, and in extreme cases, complete loss of the crop. Most garlic diseases are soil borne, that is, they exist in the soil. The soil has millions of different microbes that include both good and bad fungi. Pathogenic fungi and nematodes cause diseases while beneficial fungi work to destroy the hazardous ones.

There are many disease fungi; the ubiquitous fusarium basal rot and basal plate rot of garlic bulbs; botrytis; the feared white rot disease that can infect fields for up to 40 years; damping off, downy mildew, purple blotch, etc. and more. The Compendium of Onion and Garlic Diseases describes 60 diseases affecting garlic and onions, 40 of which are caused by fungi. Quite evidently, most garlic diseases and crop losses are caused by fungi.

Fungal diseases are increasingly spreading throughout garlic growing areas. As the industry grows and expands, they are being multiplied by a combination of infected seed garlic along with poor farming practice. Weather has an impact as well. The wet, damp spring and summer weather that we experienced in the past several years have also provided favourable conditions for some of them to thrive.

Is there a solution to this problem? First, there is no instant solution, no seed treatment or soil soak, no silver bullet that will make the problem go away. The “bad fungi” are a part of nature and exist in soils the world over. There are also the good ones, the ones that fight and destroy the bad ones, reducing damage to plants. This fact points to the ways and means to manage and control fungal diseases and prevent catastrophic crop losses. This is where organics comes in.

The organic farmer is in a good position to manage and control soil-borne diseases and their spread, having an arsenal of effective tools. It's all in using good practices.

Although not an all-inclusive list, the most important organic practices in the control of fungal diseases are:

- Disease control starts with the soil. This is where the damage occurs and this is where the solution is to be found. Developing and maintaining healthy organic soil is essential in growing healthy plants. Healthy soil teeming with beneficial microbes grows strong plants that resist disease better than the weaker plants grown in marginal soil. Healthy plants produce chemicals that reduce or prevent the infection by the fungus. The plants produce their own disease fighting drugs.

- Using compost improves soil health. Does compost reduce diseases? Not directly. Compost is not like a drug taken to fight a sickness. You don't add compost and suddenly see a plant get better. Compost changes the number and type of microbes, multiplying the beneficial organisms a thousand-fold. These microbes will in turn destroy the diseases. Mycorrhizal fungi included with the compost produce anti-biotics that protect against pathogens and improve garlic yields.
- Compost tea makes the benefits of compost go farther. Sprayed on the leaves, it helps suppress foliar diseases. Poured on the soil around the base of plants, the good microbes out-compete the disease-causing microbes. Make the tea aerobically, using a bubbler.
- Crop rotation enables disease pathogens to die off in the absence of host plants. For example, fusarium rot of garlic will be eliminated from the soil when the hosts, garlic and onions are absent for 4 to 5 years.



- Selecting and saving your own planting stock avoids importing more diseases.
- Discard diseased cloves to avoid planting them. Some growers even go to the extent of peeling all the cloves to check for disease symptoms.
- Hot water treatment of cloves before planting destroys hazardous fungi. Although not 100% effective, this treatment helps to reduce disease in the cloves.
- Rejuvenate garlic planting stock on a regular basis using the bulbil planting method.
- Selectively use cover crops to clean up soil pathogens.
- There are more good practices. Follow as many as possible in all phases of the garlic growing cycle.

The science of soil borne plant diseases is still a frontier science. Questions on what goes on in organic soil and what are the interactions between the millions of microbes and their action on plants remain unanswered. What is known is that organic practices do improve and maintain soil life and that this good soil produces healthy plants.

It is evident that diseases are unlikely to ever be eradicated. However, growers can successfully deal with this challenge by diligent organic practice. The result is healthier garlic and considerably reduced crop losses. *Editor.*

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