

What to Expect for Vegetable Diseases in 2014

2013 problems

Extension Plant Pathologist, Dr. Lina Quesada-Ocampo has been analyzing some of the issues that plagued vegetable growers last year. During 2013, the Plant Disease and Insect Clinic at NC State University analyzed about 460 vegetable samples.

- The majority of samples were **solanaceous** (tomato, potato, pepper, eggplant) and **cucurbit** (melons, squash, cucumber) crops, followed by brassica crops (cabbage, broccoli, collards, turnip, kale), sweet potatoes, allium crops (garlic, onion), lettuce, beans and spinach.
- The majority of samples (58%) were affected by a plant pathogen (oomycete, fungi, bacteria, virus, or nematode). But when they separated out the diagnosis by type, the most frequent diagnoses during 2013 were abiotic (non-living) causes:
 - 35% – fertilization, soils, salts, water stress, injury, chemical burns, weather, etc.
 - 25% – oomycete diseases (in order, downy mildew, Phytophthora, and Pythium)
 - 21% – fungal diseases (in order, Fusarium, anthracnose, Alternaria, and gummy stem blight)

Note again that the largest percentage of diagnoses by type were not infectious diseases but other external causes – some that we gardeners caused or failed to control, others that may have been beyond our control. After those fungal and oomycete diseases were dominant.

- For the solanaceous crops (tomato, pepper, etc.) the abiotic problems accounted for fully 39% of problems diagnosed.
- Among the brassicas (cole crops like cabbage, broccoli, etc.) the abiotic problem numbers rose to 49%!

So while we like to wonder “if there is something going around,” frequently we are our own worst enemies. Consider again some of the causes of abiotic diagnoses: excess fertilizer, poor soil preparation, high levels of salts (from fertilizers but sometimes from excess compost), too much or too little water, chemical burn (pesticide drift or too much of something applied to the crop), weather (planting in soils too cool or too late in the season, hail), or just physical injury by pets, wildlife, or careless gardeners.

Abiotic issues notwithstanding, there were plenty of fungal and oomycete diseases such as early blight of tomatoes or downy mildew of cucurbits. Last year we had a lot of rain, which unfortunately favored several vegetable diseases and made crop protection and fertilization efforts difficult. For the coming year, we may still face some challenges as a result of last year’s impacts. Soil borne pathogen levels may have increased in gardens plagued by diseases last year. The high levels of diseases may have facilitated survival of pathogens in weeds and volunteer plants, and flooding may have allowed movement of soil borne pathogens into irrigation water sources or adjacent plots. Thus this coming year, it is especially important that you take every precaution to avoid plant pathogens since conditions may be more conducive for disease than in previous years. Dr. Quesada-Ocampo suggests we consider the following strategies to minimize impacts:

Use pathogen-free seed and transplants

For diseases potentially being introduced through contaminated seed or transplants it is important to start with pathogen-free material. Inspect transplants carefully. Destroy any seedlings showing symptoms of disease and all neighboring seedlings.

Use appropriate growing practices for your crop

Provide adequate irrigation, fertilization, and general growing conditions required for your crop. A vigorous plant will defend itself better from plant pathogens than one that is stressed. Vegetable crops are most susceptible to diseases when there is an underlying abiotic stress or injury. Having good soil, fertilization, and insect control habits will result in a healthier Crop.

Use crop rotation

If you experienced disease problems last year, rotate away from crops that are also hosts of the pathogens you dealt with last year. It is important to accurately identify the affecting pathogen since it will dictate the appropriate rotational crop. Some growers also use cover crops, solarization, fumigation, and grafting in cases where inoculum levels of soil borne pathogens are high to successfully reduce disease.

If practical you may consider turning over the soil since most pathogens are found in the first 5 to 10 inches of soil, however, this will only be helpful for one year.

Use resistant varieties when available

Many seed companies carry disease-resistant varieties. Check this U MN blog post to find out if a variety has the disease resistance you need:

[Start out smart – Plant Disease Resistant Vegetable Varieties](#)

Cornell University has another list of vegetable varieties with disease resistance available from seed companies,

[Tables of Disease Resistant Varieties](#)

Maintain good sanitation practices

Different pathogens can survive for short or long periods of time on soil, tools, weeds, insects, and volunteer plants depending on the organism. If you know you have an infested area, take precautions to avoid introducing the pathogen into a new area; avoid moving contaminated soil and tools.

Diligently control insects and remove weeds, volunteers, and plant debris that can be harboring pathogens. Dispose of any plant debris away from your garden and in a way that will minimize escape of fungal spores into the air or irrigation water. You can use a plastic bag; avoid cull piles.

If you need to prune your plants, use sanitized tools. Avoid handling plants when wet since wounding in the presence of water frequently results in introduction of pathogens into the plant.

Make growing conditions unfavorable for disease

Planting early in the season often helps avoid the high pathogen levels that occur well into the summer. Using mulch will help prevent pathogens from reaching leaves and fruit through soil splashing. Leaves are often more susceptible to disease than root and stem tissues. Water management is essential for disease control: ensure good drainage, use raised beds and drip irrigation, and promote air movement to help prevent disease.

Know your enemy

Accurate diagnosis of the pathogen causing problems in your crop is the first step to control disease. The [Plant Disease and Insect Clinic at NC State](#) via your county Extension office can assist you with diagnosing plant diseases and providing control recommendations. Once you know which pathogen is affecting your crop, become familiar with the disease by consulting information in the [Extension Plant Pathology Portal](#) and talking to your Extension agent so you can design a disease management plan that works for you.