Dealing with Garden Pests and Diseases

Spring is an exciting time in the food garden. Tiny seedlings poke through the soil. Newly set out transplants raise their leaves to the sun. Everything is thriving – until one morning you go out to the garden and find holes chewed in leaves or plants wilting and yellowing. A pest or disease is at work! Now what do you do?

It's safe to say that, sooner or later, every gardener will encounter a pest or disease problem affecting plants in a food garden. The specific problems that can occur will depend on the crops you're growing and where in the country you're gardening. Fortunately, there are some easy strategies you can follow to make pest and disease problems less likely to occur and less damaging when they do. Even so, there will likely be occasions when pests or diseases reach levels where some sort of control measures may be warranted. It's a good idea to think ahead of time about the type of pest and disease controls you think will be appropriate in your school garden and to have a plan in place for implementing them if the need arises.

Insects are certainly major pests of vegetable crops. But other groups of creatures can wreak havoc as well. Mites may appear similar to insects, but they are actually more closely related to spiders (if you peer at them through a hand lens you'll see eight tiny legs, not six), while slugs and snails are mollusks. Diseases are caused by a variety of tiny pathogens, including fungi, bacteria, viruses, and nematodes (microscopic, worm-like animals). But not all diseases are infectious; some, like blossom end rot in tomatoes or sunscald on peppers, are the result of poor environmental or cultural conditions.

Know Your Enemy

Familiarizing yourself with the pest and disease problems that you're likely to encounter is a good first step in coming up with a pest and disease control plan. Which ones are potential problems will depend on what crops you are growing, of course, but also on where you garden. While many pests and diseases are widely distributed, some are most problematic only in certain areas. Knowing what to be on the lookout for and when makes figuring out what's causing a problem much easier. There are many sources for information on vegetable pests and diseases, but one of the best is your state Extension Service. The information they provide is targeted to the problems that are most likely to be troublesome in your part of the country.

Practice Prevention

As they say in sports, the best offense is a good defense. Here are ways you can keep pests and diseases from gaining a foothold in the first place. While some of these strategies require some advance planning, they will stack the deck in favor of a thriving garden and make your gardening experience much more rewarding and fun.

1. **Feed the soil** – Just as people who eat a nutritious diet and get adequate exercise and rest are less likely to get sick, robust plants are better able to fend off pests and diseases. Heathy soil is the foundation for healthy plants. Regularly add organic matter like compost to encourage thriving populations of the soil microbes and other beneficial critters needed for healthy soil.
2. **Practice good garden sanitation** – Clean up the garden well at the end of the growing season. Many pests and diseases carry over from one year to the next in plant debris in the garden. Don't compost any obviously infected or infested plant material. You can't depend on most home compost piles to heat up enough to kill pests and diseases.
3. **Rotate the location of related plants in the garden from year to year** – This helps to thwart soil borne pests and diseases. A 3-year rotation is best for most crops, but if this isn't practical in your space, just do the best you can.
4. **Be the Goldilocks of soil moisture** – Aim for soil that is not too wet and not too dry – just consistently, evenly moist. Try to avoid getting the tops of plants wet when you water, as wet foliage promotes the development of many diseases. Use soaker hoses or drip irrigation, or water early in the day so leaves dry quickly in the sun. Don't work in the garden when leaves are wet from rain or dew to avoid spreading diseases from plant to plant.

5. **Space plants out so there is good air circulation around them** – Crowded plants trap humidity, encouraging diseases.
6. **Don't import problems** – Examine any transplants carefully (especially leaf undersides) before buying to make sure there are no unwanted stowaways, and only select vigorous, healthy-looking plants.
7. **Plant lots of flowers to attract beneficial insects** – Let Mother Nature help with pest control by encouraging the insect species that prey on pests, helping to keep a natural balance in the garden. Include flowers in the food garden to provide pollen and nectar to feed predatory and parasitic insect species at certain stages in their life cycle. Plants with blossoms consisting of umbrella-shaped clusters of small flowers, such yarrow or dill, and daisy-like flowers like golden marguerite and coneflowers are especially attractive to many beneficials. A border of flowers around the vegetable garden is an excellent way to provide food and shelter for them. Learn to recognize all life cycle stages of the "good guys" so you don't mistake them for troublemakers. Immature stages may look very different from adults.
8. **Choose disease-resistant varieties if possible** – These are varieties that have been bred to be less susceptible to some of the common diseases of a particular crop. Look for letters after the variety name indicating resistance, or check the plant catalog, seed packet, or tag for information. For example, tomato varieties with the letters V and F after their names are resistant to verticillium and fusarium wilts, two common tomato diseases.
9. **Keep weeds under control** – They not only compete with your crops for nutrients, light, and water; some weeds can host pests as well. The same pests that attack garden crops can also infest nearby weeds that are in the same botanical family. Spreading mulch is a great way to keep weeds down and help conserve soil moisture.
10. **Use barriers and traps** – Lightweight fabric row covers that let water and sunlight through are very effective in preventing certain pest problems, such as leaf miners in spinach or caterpillars in broccoli. In non-fruiting crops that don't need pollinating, you can even leave row covers in place all season long. Flowering crops such as cucumbers and squash can benefit from row covers to keep flea beetles and cucumber beetles away when plants are young and most vulnerable to damage. Once plants begin to flower, remove row covers to let bees reach flowers for pollination. Cutworm collars and mats around cabbage stems to prevent root maggot egg laying are other examples of effective barriers. Placing saucers of stale beer in the garden to lure slugs in to drown is a time-honored and effective trap.

They're Heeeeere!

In spite of your best preventative measures, there's bound to be a pest or disease outbreak in the garden sooner or later. If you take time now to decide what kinds of control measures you consider appropriate for your garden, you'll be better prepared to deal with any problems that arise. Will you take a hands-off approach and let nature take its course? Will you limit controls to physical methods such as barriers, traps, and handpicking? Will you consider using pesticide or fungicide sprays? Will you use only organically acceptable pesticide controls? Will you consider using synthetic chemical pesticides? Who will be responsible for applying pesticides? There is no one right or wrong approach; it's whatever works best in your particular setting.

- Check your plants frequently for the first signs of insect and disease. It's much easier to nip a small problem in the bud than to control a severe one. You may be able to stop a small aphid infestation by simply knocking the insects off plants with a strong stream of water from a hose. If you wait until your plants are swarming with aphids, more drastic measures will be needed.
- On the other hand, don't pull out the big guns when they're not needed. Before resorting to insecticide sprays, make sure that the number of pests and the damage they are causing warrant that level of control. Extermination of all pests isn't necessarily desirable. If you're enlisting the help of beneficial insects, they need to have some of the pests around to feed on or they'll move on to greener pastures. What's needed is a balance where there are enough pests to support beneficials, yet not so many that they are causing an unacceptable amount of damage to your crops.

- Be sure to identify specifically what pest or disease you're observing in order to know what control measures, if any, are appropriate. Do some research to understand the life cycle of any pest or infectious disease and at which stages in the cycle treatments are most effective. Keep in mind that some problems are caused by poor weather or growing conditions, not insects or disease organisms. Solving these problems involves changing the environmental conditions that led to them, where possible, not the use of pesticides.
- Consider physical controls first. Larger insects like tomato hornworms and Japanese beetles are relatively easy to control by handpicking (if you're squeamish, just wear gloves!). Handpicking insects is easiest in the early morning or evening when cool temperatures make them sluggish. Dispose of them by dropping them into a bucket of soapy water (the soap breaks the water surface tension so they can't escape). Picking off and disposing of infected leaves may control the spread of some diseases at their outset.
- If a problem is severe and you decide use of a pesticide is warranted, keep these things in mind in order to use it safely and effectively.

Lower-toxicity, often naturally derived insecticides are generally the most appropriate choices for school garden use and have the least harmful effect on beneficial insects. These include insecticidal soap, horticultural oil, botanical insecticides like neem oil and pyrethrin, and microbial insecticides like Bacillus thuringiensis (Bt). Some of these products may be suitable for organic gardening; look for OMRI certification on the label to be sure. Different pesticides are effective against different pests; check the label to make sure you are using an appropriate product for the particular plant you're treating and the pest you want to control.

Make sure that the pest or disease you are trying to control is vulnerable to an applied pesticide. For example, squash vine borers are caterpillars that tunnel into the vines. Once inside the stems, they are safe from any externally-applied insecticides.

No matter what type of pesticide you use, always read the label completely before you apply it and follow all its instructions and precautions exactly. Make sure that the plant you are treating and the pest or disease you are trying to control are both listed on the label. Following the label ensures that you are applying the product in a manner that is safest for the applicator, the plant it is being applied to, and non-target organisms like bees, while most effectively controlling the pest or disease causing problems.

Fungicides are preventative. They can prevent the spread of diseases caused by fungi to uninfected parts of the plant, but they will not cure existing infections. They must be applied at the first sign of infection or before infection occurs to be effective, and usually require repeat applications to keep plants protected. Fungicides will not control diseases caused by viruses, bacteria, or nematodes; only non-chemical controls are appropriate for these organisms in a school or home garden setting.

Be cautious with home remedies. You can find all sorts of recipes for homemade pesticide treatments in garden books and online, and some of these may be effective. But they also have the potential to harm plants. For example, there are many recipes for homemade soap sprays, but there is no way to know if the particular brands of ingredients you select might have something in them that can harm your plants or be less effective in controlling pests. Commercially prepared insecticidal soaps have been specifically formulated for and tested on plants, and you are more assured of getting the results you expect when you use them. If you do decide to try a homemade treatment, try it on a small number of plants first to see if it causes any plant injury before applying on a larger scale.

Don't Get Stressed!

Don't let all this all this talk of insect and disease problems discourage you! While you're likely to encounter pests and diseases in your garden at some point, usually they will affect only certain crops in a particular season, not everything in the garden. Even while bean beetles are chomping on the beans, your tomatoes, lettuce, and cucumbers may be thriving. So planting a diversity of crops is one way to minimize the impact of any pests and diseases that occur. If one type of vegetable develops major issues every year in your garden, consider simply planting something else in its place. There are lots of different veggies to choose from, and you may end up expanding your students' food horizons by trying something new. And if you have put at least some of the preventative measures discussed earlier in place, any problems that do arise may not cause significant damage.

As we said before, there is no one correct approach to dealing with pest and disease problems in a school garden. Taking a hands-off or low-input approach is just as valid as employing more intensive control strategies. No one is going to go hungry next winter if you decide to simply let those bean beetles have at the green beans.

One of the great things about gardening in a school setting is that just about everything – even a pest infestation – can be a springboard to learning. The life cycles of many insects and fungi are nothing short of amazing. Learning about these kinds of organisms really comes to life when kids can go out into the garden and observe them in action, even if they are feeding on the tomatoes! Observing interactions between predatory and parasitic organisms and their prey is a good way to introduce concepts like the food web and the interconnectedness of natural systems.

Finding tomato hornworms covered with the rice grain-like cocoons of parasitic wasps and learning why these parasitized caterpillars should be left in the garden so the wasps can complete their life cycle will vividly illustrate these concepts to students. Identifying introduced pest species like Japanese beetles or brown marmorated stink bugs can be the starting point for a discussion on the impact of invasive species on an ecosystem. And learning that those brightly colored caterpillars feeding on parsley, dill, or carrot plants will turn into beautiful swallowtail butterflies helps kids understand that there are really no “bad bugs” in nature - in the complexity of a balanced ecosystem, all creatures have value and a role to play.