ARIZONA COOPERATIVE EXTENSION
Pinal County

Pinal County Cooperative Extension
Garden & Landscape Newsletter
June 2008

MID-SEASON TOMATO PROBLEMS

It is now mid-season for home grown tomatoes and some gardeners are experiencing difficult, crop-threatening problems with their plants.

There is a trick to growing healthy, vine-ripe tomatoes. Many try their hand at growing them, but because of this problem or that, many are not really satisfied with their production. This time of year, there can be several key problems that give trouble. Here are the worst offenders.

Tight, compacted soils are often a culprit for poor tomato production in the desert. Our desert soils, because of a lack of natural organic matter content, can easily become squashed, mashed and pounded into hard layers that prevent root growth and make it difficult for plants to develop an adequate foundation for later growth and fruit development. Good soil preparation before planting, and careful attention during the growing season, will encourage the development of a deep root system so necessary for adequate uptake of water and nutrients.

Additional nitrogen can be added a little at a time during the growing season to ensure that the plant does not run short at critical times. Nitrogen is best added during irrigations so that the water will carry the nitrogen down into the root system. Use a water soluble form, like ammonium sulfate, that will dissolve easily in the water for these mid-season applications.

Tomatoes must receive frequent irrigations in order to produce good fruit. Without proper irrigation at the right times, there will always be problems. Blossom-end rot on the fruit and fruit cracking are considered to be the result of growth spurts followed by growth checks, or stoppages, usually because of improper irrigations.

Ensure that the soil moisture is adequate during the entire growing season, but do not keep the soil too wet or root rot may occur. The decision to irrigate or not to irrigate is a critical step in the management of tomatoes. The frequency and duration of irrigations is specifically dependent upon the type of soil in which the plant is growing. Sandy soils require more frequent irrigations, perhaps on a daily or every other day cycle, while clay soils may need to be irrigated only once a week.

To determine when to irrigate in your garden, dig down with a shovel or probe with a soil auger to a depth of about six inches and check the moisture levels in the soil. If the soil forms a tight ball and leaves a wet outline on your hand when you squeeze it, hold off irrigating until the ball of soil, while still cool to the touch, begins to crumble at the edges. The length of irrigation should be long enough to fill the entire root zone of the plant. Most tomato roots will be found in a band from ground level to about eighteen to twenty-four

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The edible fig is a popular fruit tree that does exceptionally well in Southern Arizona, but its dark green, handsome foliage and its thick, dense canopy also make it an ideal candidate for a topnotch landscape tree.

In almost all landscape designs, there is a place for screening plants, that is, plants that block an unsightly view or provide privacy for a secluded nook. Large shrubs, such as the common oleander and the privet, and small trees, such as the Eldarica pine and the arborvitae, are often used for these purposes. The fig tree with its dense canopy and its close-to-the-ground growth habit can provide not only a tasty fruit in season, but can also fill a special niche in the landscape.

Most screening plants are evergreen, that is, they retain their leaves or needles throughout the year. The fig is deciduous, meaning that it will lose its leaves during the winter months. During the summer, when the fig has its leaves, its canopy is dense enough to screen out the most unsightly of views; but during the winter months when the branches are bare, much of its screening ability is lost. The benefit of the fig, however, is that where evergreens provide a never-changing view, the deciduous fig provides a different look twice a year that can provide variety to a landscape.

Although generally a low-maintenance plant, the fig does, however, have its problems. Fruit drop may result from insufficient irrigation or loss of tree vigor. Figs that develop at the tips of branches late in the season are often dry or they drop because of cool weather.

Nematodes, microscopic plant-feeding roundworms, can attack the roots and weaken tree growth. Premature leaf shed and poor fruit development are typical symptoms of nematode damage, and small swollen knots on feeder roots confirm the presence of the more common root knot nematode. Figs can be quite devastated by their attack; however, nematode problems are generally confined to trees growing in sandy soils.

Like many other plants, figs are highly susceptible to Texas root rot. Gardeners should avoid planting figs into known root rot areas.

Nearly ripe figs may split open because of adverse weather conditions, such as sunburned fruit or dry weather, or following the irrigation of soil that was allowed to become too dry. Split figs rapidly spoil and attract unwanted insects.

Figs can also sour from bacteria and yeasts tracked into the interior of the fruit by sour fruit beetles through the eye or blossom-end opening of the fruit. These problems vary in intensity from year to year depending upon temperature, humidity, and insect populations. Figs with very small eyes, such as the Mission or Canadria varieties, tend to exclude more insects than varieties with large eyes, such as the Brown Turkey. The incidence of sour fruit can sometimes be avoided by harvesting daily and promptly discarding all spoiled fruit.

Despite these problems, the fig remains an excellent fruit tree for the Pinal County area. The subtropical varieties mentioned above seem to do best in this desert climate, although the hot summer temperatures can occasionally cause some leaves to turn brown and die. Young figs are susceptible to frost damage the first few years, but mature trees will tolerate temperatures down to 15° F.

Fig trees are normally pruned to an open center or vase-shaped frame. After transplanting, cut them back to approximately two and one-half feet above the ground to induce low branching. The next winter, select four or five vigorous branches about three to four feet above the ground. These will become the major scaffold branches and will produce the fruiting wood for future harvest. All other limbs should be removed.

Annual dormant pruning in later years should include the removal of weak and undesirable branches and lightly cutting back branches to control the height and width of the tree, if necessary.

Nitrogen is regularly needed for good growth and should be added regularly. Mature trees, that is, those five years and older, need one pound of actual nitrogen or five pounds of ammonium sulfate per year. One pound of 21-0-0 equals two cups of product. Younger trees will need less.

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f you would rather use alternative control methods rather than chemicals every time you have a pest problem, we need to talk about Integrated Pest Management, or IPM.

IPM, a pest and disease control tool that has been successfully used in commercial agriculture for thirty years, can be applied to help improve the health of garden and landscape trees, shrubs and annual plants.

IPM, does not just rely on one or two methods for controlling pests, but seeks to bring all possible resources to bear to help keep insects, weeds and diseases at a non-threatening level. Those who employ IPM principles do not necessarily try to eliminate every single pest, but do strive to keep pest populations at an acceptable level.

Healthy plants, just like healthy humans, can be exposed to some feeding by insects or invasion of disease without suffering long-term or permanent damage. It is only when the pest or disease population reaches harmful levels that the health and productivity of plants can be affected.I
In agriculture, where profit matters, harmful levels are called the economic threshold, or the trigger than requires some kind of intervention in order to prevent economic loss. In the garden, I call this trigger the worry point, or the point at which a gardener needs to worry about taking some sort of action. When populations exceed the worry point it is definitely time to take corrective action; sit back, relax and enjoy the garden.

In the home garden, people often worry too soon about infestations of insects, but sometimes they wait until it is too late. The trick is to catch the problem at just the right time in order to protect both the plant and the environment. This is the goal of IPM.

For example, too often when even one or two insects are spotted in the garden, we feel obliged to get out the sprayer and wage battle. In the minds of many, it does not matter if the insect is feeding on a part of the plant that will never be harvested, or whether there are many beneficial insects mixed in with the pests. We have to spray! Following the principles of IPM, we would identify the pest, estimate the damage and then make an informed decision.

So, where do we get started? First, to successfully use Integrated Pest Management, it is essential to know the enemy. Which of all the insects is actually causing the problem? How many are there? Are the numbers there harming the plant? What are the predators and parasites doing? Are they keeping up? What is the weather doing? Will it increase or decrease the population of insect, weed or disease pests?

Once these questions are understood and answered to our satisfaction, an intelligent decision can be made about whether or not we are at the worry point. If indeed it is time to really do something, spraying pesticides may not be the best answer. IPM seeks to identify the best method for controlling these pest problems using cultural or biological control methods first, then chemicals as a last resort. Using IPM, agriculture has been highly successful nationwide in reducing the number of pesticide sprays to a bare minimum. This has translated into a big reduction in chemicals released into the environment. Once viewed as polluters, most agricultural producers are now seen as good stewards of the environment. Gardeners need to come to see themselves in this light. IPM is the key.

Once the problem has been identified and a population estimated, how do you know when it is actually time to worry? This is where experience comes in. Personal experience based upon sound scientific principles is the best way to know what is right for your garden situation. Cooperative Extension can help. Trained Master Gardener volunteers are available to help answer these kinds of questions and Cooperative Extension bulletins can provide timely and accurate information for pest and disease control.

Most recommendations will center around the selection of various control options when action is required. Biological control will always be a first line of defense. There are so many different types of predators and parasites in the environment naturally that they often do the job by themselves. This is one reason why we do not want to be too quick to spray harsh chemicals. It kills the beneficial insects right along with the pests. Once the beneficial insects are gone, there is nothing to keep the pest insect in check and they often comeback worse than before the application was

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HORTICULTURAL THERAPY

If the stress of everyday life is getting you down, or if you have a medical condition that would respond to activities associated with plant care, you may want to take up gardening.

In scientific circles it is called horticultural therapy. Horticultural therapy is the term used to describe the use of plants to help maintain or rebuild the health of people. It is particularly effective in helping those who may be experiencing the effects of advanced age, mental or physical disability or other medical conditions requiring the rehabilitation of motor skills and hand-eye coordination. It is also a good way to reduce stress.

Horticultural therapy uses plants and gardening experiences to help patients practice certain skills, obtain exercise or learn new concepts. Working with plants, for example, can provide exercise for arms, hands and upper body muscles. Combined with stooping or kneeling, other muscle groups can also be exercised. Exercise from gardening can also help improve motor skills and breathing, and also help lower blood pressure.

This type of therapy also tends to draw people into group activities which helps them, at least for a short time, take their minds off their illnesses and disabilities. Working on a joint project with other patients, therapists, or members of the family provides an opportunity to interact with others and can help a patient learn to share responsibilities and to communicate with others. Group participation in horticulture therapy can enhance problem solving skills, help patients to learn how to follow directions and improve concentration and attention span.

Many people that participate in these type of gardening activities often find that it helps lift a patient's spirits. Plants need to be nurtured. People who have become dependent on others as a result of their afflictions have the opportunity to change roles, and become the care-giver instead of being the care-receiver.

Another benefit is the improvement of a patient's self esteem. Pride in one's accomplishments can lead to a greater sense of self worth and fulfillment. Many gardeners also feel a special connection to the earth and to their surroundings. Plants do not discriminate and do not judge. A person's looks, economic status, physical or mental state do not matter to a plant and a patient can relax and not worry about being judged.

There are many activities and crafts centered around plants and plant care that can provide horticultural therapy. Simply repotting a house plant or planting seeds in a cup with potting soil can be good way to get started. Making a seed mosaic with different varieties of bean seeds can be fun for all ages. Others find flower arranging, planting a desert dish garden or learning about different types of soils fun.

Square-foot gardens outdoors can provide therapy opportunities without costing a fortune or taking the time and effort of a larger garden. For those confined to a wheelchair or who have trouble bending, kneeling and stooping, elevated raised gardens of various heights and dimensions may allow easy access.

Still other patients may be even more confined. Placing flowers or plants in the room may give these patients the opportunity to observe and admire their color, size and smell. Often times they may recall flowers or gardens in their past which helps them link with the present, or even the future. Many other benefits have been noted among patients where they have had the opportunity to use their sense of smell, touch, taste, sight and hearing.

Another way to involve the ill and disabled in horticultural therapy is to plant and maintain a peaceful and protected garden that is easily accessible to the patient. These types of gardens can provide a place for meditation, renewal and reaffirmation that are so critical for patients who are trying to work themselves back to good health. Medical personnel often comment that a patient's can-do attitude is often the difference between a successful and a less successful recovery.

Some long-term care institutions have begun using outdoor gardens for therapy. A typical therapeutic garden will contain four key elements: an enclosing wall, a water feature, an overhead canopy, usually of tree branches and leaves, and a small, elevated hill. Each of these elements

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inches. Each irrigation should send water to at least this depth. Check your moisture depth with a probe or shovel. A probe will slip easily into moist soil but stop abruptly when it reaches dry soil. Place your fingers at soil level before pulling out the probe and you will be able to measure the depth of your irrigation.

Toxic levels of salt in the soil can also be a problem. When salts build up in the soil to toxic levels, tender plant tissues will begin to die. The most common symptom is tip-burn or margin burn of leaves. When the tips or the edges of leaves die back toward the center of the leaf, it usually is because of salt concentrations. Salts can be managed by watering long enough and deep enough to leach these water soluble chemicals down and out of the root zone.

Insect pests are common this time of year. It is always startling this time of year to find a large caterpillar with a predominant horn on its hind end feeding on the vines and fruit. The tomato hornworm can reach four inches long and almost as big around as a finger. The large size of this animal makes it bulky enough to consume entire leaves and small stems.

Tomato hornworms can be hard to find in the garden. They are dark green in color, which matches the color of the foliage of the vines, and they have silver to white lines arranged diagonally along their bodies which gives them a bit of camouflage to hide them from their enemies. Sometimes it is easier to find their large, dark green to black droppings than the animal itself. Their droppings, about match head in size, can be found either on the surface of the ground underneath the plant or on the leaves themselves. If you see the droppings, look around closely because they will be there, somewhere, hiding...and eating.

The best way to get rid of hornworms is to simply pick them off by hand or to snip them with shears. It is quick and easy to do. When they are small, *Bacillus thuringiensis* may also give some relief. If they have been a particular problem in the garden during the season, rototilling after harvest will get rid of resting pupae which have burrowed into the soil to wait out cold or hot temperatures.

Aphids can also be a problem in tomatoes. Aphids are soft-bodied insects that remove valuable juices and nutrients through sucking mouthparts. Since almost every aphid at this time of year is a female, and because aphids give birth to live young, populations can explode quickly. The problem is further enhanced because female aphids do not need to mate to produce young. One aphid today can mean thousands tomorrow, their reproduction is that rapid.

Check regularly for aphid populations in the garden. Especially look on the underside of leaves because they prefer the bottom surfaces. It protects them from the environment and enemies. However, they will also be found on the upper sides, so check both sides.

Predator insects like lady beetles and lacewing larvae will clean up an aphid infestation quickly but sometimes considerable damage can occur before the problem can be completely resolved. Help the natural predators along by washing the plants off early in the morning with a strong stream of water from the hose. Once the aphids are off the plant, it is difficult for them to return. It may take several treatments at regular intervals to keep the aphid population low. Remember, they reproduce quickly.

Spider mites are not insects. Insects have six legs, while mites have eight. However, spider mites can be a serious problem on tomatoes. They typically leave webs on the leaves that look like spider webs. They also cause the leaves to turn a bronze or brown color. Check for spider mites by dusting the leaves into the palm of your hand and watch for the dust particles to start to move. Washing the plant with a strong stream of water on a regular basis and using insecticidal soap are good control options.

Tomato russet mite is a tiny beast that cannot be seen without magnification. Under a 20x power hand lens, the mites look like whitish-yellow pear-shaped bodies which move slowly. Tomato plants typically respond with symptoms that include a bronze color on the lower leaves and stems with the discoloration gradually moving higher into the

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plant. The lower leaves can dry and eventually drop from the plant. The control is pretty much the same for spider mites.

If you find that you are having the same insect problems year after year and season after season, it may be important to plant another type of plant in that spot for a while. Crop rotation it is called, and it has been a method of pest control since medieval times. Insects and diseases are usually host specific, that is, able to live and reproduce on only a few different plants, sometimes only on one specific plant. By changing to different plants each season, natural enemies and the limitations of stored energy in the resting stages of the pest itself may reduce the level of pest populations to manageable levels.

Sometimes tomatoes in local gardens grow beautiful, full vines but do not set fruit until fall. Even then, fruit set will be sparse. A common observation is to see the plant put out lots of flowers but shortly after see the flower abort or drop off the plant before setting fruit. This particular problem may be a result of that particular variety's sensitivity to desert conditions. If this problem happens to you, consider planting another variety next season.

Finally, protect tomato fruit from sunburn. The harsh sun can quickly burn tender fruit and leave them with yellow or brown spots in the fruit. Place a good nursery shade cloth, or even a layer of burlap, on a frame above the tomato vines. The shade will allow sufficient sunlight into the canopy of leaves to produce the energy necessary for plant growth while screening out the harshest rays.

FIGS

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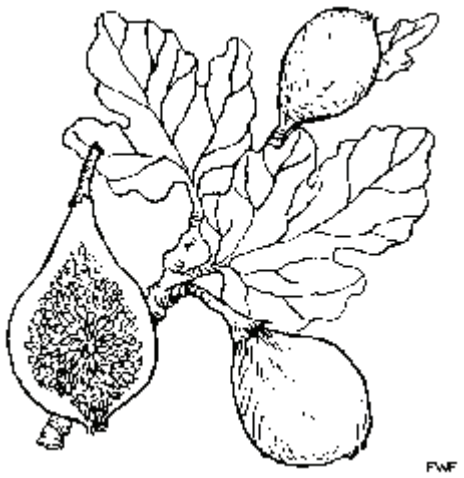
Nitrogen fertilizers should be applied in a minimum of three applications. Divide the five pounds of fertilizer into three equal parts and apply the first in February, the second in May, and the final application in August. The fertilizer should be evenly spread towards the outer area of the irrigation well before being irrigated into the soil. Other nutrients, such as phosphorus, potassium, and zinc, are generally sufficient in local soils.

Fresh figs should be harvested when they are fully ripe. Ripeness can be determined by bending the fruit neck. Ripe fruit will have a flexible stem, whereas green fruit stems will be stiff. To reduce fruit spoilage after harvest, remove the fruit with the stem still attached.

Figs are good candidates for any home landscape where they can provide the benefits of seasonal shading and screening and sweet, good tasting fruit.



Fig

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originally made. If beneficial insect populations in the garden are low, additional insects can be purchased and released to build up the friendly forces.

Another way to control pests is through cultural control. Proper spacing of plants, proper watering and fertility, and cleaning up and removing diseased plant parts are examples of cultural control. In the desert, proper plant care is absolutely essential for maintaining good plant health. Improper watering, under-fertilization, leaving stubs after pruning and over-crowding plants in the garden leave many plants seriously harmed or dead each year. Too often, we try to cover up problems caused by improper care with chemical sprays.

Chemical control is the last resort. Pesticides should be used only when all other means have been exhausted and then the least-toxic materials should be considered first, especially if beneficial insects are present. The primary concern is toxicity to insect and mite predators. Secondly, the material should be least-toxic to wildlife, pets and children. Insecticidal soaps and oils usually have less effect on non-target animals than more toxic materials.

When selecting a chemical control agent, it is important to always read the label. The label will give you all of the information you need to make a safe and effective pesticide application. The label should be read at least three times: once before it is purchased, once before it is mixed and used and once when it is time to clean up after the application and before storage. Keep pesticides away from children and pets for safety.

Integrated Pest Management, or IPM, can be a big help to the home gardener in protecting the health and well being of garden and landscape plants. At the same time it can help protect the environment in which we all live.

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provides a different type of feel to the garden that all added together, provide that rejuvenating atmosphere so crucial to the healing process.

For those who may not have a medical condition but do face stress each day, working with plants can be a way of calming the nerves and reducing the pressures of life. The very tangible benefits that come from increasing our physical activity and changing our focus go a long way in helping wash away our everyday cares. There are those who say that long term, overwhelming stress can lead to more serious medical conditions. Anything that can reduce stress, they say, benefits our health.

The medical profession has learned much in recent years about the process of healing. It continues to learn more each year. The body of knowledge indicates clearly that horticultural therapy, both formal, as is found in a hospital or care center, or informal, such as what you and I would do in our own homes, is a valid way to help us address real issues in our lives.

So what is the take home message? There are three. 1) Horticultural therapy can be a balm of life to all people, no matter what their age, physical condition or walk of life. 2) Plants can give us a new focus that is at once healthy and satisfying. 3) Gardening may be just what the doctor ordered.

If you have questions, you can reach one of the Master Gardeners at the Cooperative Extension office, 820 E. Cottonwood Lane, Building C, in Casa Grande. The telephone is (520) 836-5221. The author's email address is gibsonrd@ag.arizona.edu.

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