



## **CREATING AN ORGANIC GARDEN IN SOUTHERN NEVADA**

ANGELA O'CALLAGHAN PH.D., UNCE AREA SPECIALIST, SOCIAL HORTICULTURE  
PEGGY MCKIE, AGRICULTURIST IV, NV DEPT OF AGRICULTURE

Many people welcome the idea of growing fresh fruits and vegetables using the most “natural” means available. This generally means trying to follow organic procedures. New gardeners, or those changing from pesticides and artificial fertilizers to a more organic method, often have many questions about how to use this approach.

In 2002, the Agricultural Marketing Service of the USDA implemented a set of national standards for organic production. These rules ensure that the same practices and definitions are used by all growers in all states throughout the nation. If a farm is to be certified “organic”, it must have had no prohibited substances applied to it for at least three years. While these specific regulations are geared toward commercial producers, the overall principles can be applied to gardens and large agricultural enterprises alike. The entire national standards document can be found on the internet at <http://www.ams.usda.gov/nop/NOP/standards/FullText.pdf>. A more concise presentation of the information is at <http://www.ams.usda.gov/nop/ProdHandlers/ProdHandhome.html>.

### **WHAT IS ORGANIC GROWING?**

Organic gardening or farming does not simply mean avoiding herbicides, fungicides, insecticides and synthetic fertilizers, although this is a crucial part. It is far more than simply replacing one group of pesticides with another. Rather, it is a system of creating an environment that reduces the population of potential pests (insects, diseases or weeds) and promoting plant health to increase resistance to predators and pathogens. This requires that the gardener provide the right soil conditions, select healthy plants, and follow proper cultural practices. It also requires a gardener to “scout” the landscape regularly –checking the garden for pests and addressing problems while they are still manageable.

### **CULTURAL PRACTICES**

Organic practices require that the environment be a healthy one. When the environment provides the necessary light, temperature, water, nutrition and adequate space, plants will have a better appearance and they will be more productive. They will also have the resources needed to deal with pests.

#### **FIRST - IMPROVING THE SOIL**

Soils in the desert southwest tend to lack organic matter, and have either very slow or very fast drainage. Overly slow drainage may be due to high clay content or to a hard, impermeable layer beneath the surface. This can cause plant roots to be inefficient and even to decay. Extremely fast drainage is typical of high levels of sand. In this case, the soil tends to dry quickly and require frequent irrigation to meet plant needs.

Desert soils are frequently quite alkaline because of the large amount of calcium present, which can cause certain essential minerals to be unavailable to plants. These conditions make the soils inhospitable to plants, unless they are native or desert-adapted.

Most garden fruits and vegetables are not adapted to desert conditions; they require soils that are richer in nutrients and have enough, but not excessive, water.

Adding compost can ease many of the problems posed by the native soils. Compost is organic matter that has many of the nutrients essential for plant growth. It acts as a sponge



to improve drainage, and tends to balance soil pH. Another way to lower soil pH is to add sulfur to the soil. This is effective, but the process is slow; it will take at least months for the pH to become markedly lower.

If garden soil or mix is purchased, insist that it be free of weeds and their seeds. Improved soil will have good drainage and few pests, decreasing the need for pesticides.

A popular technique is to build raised beds where the soil is highly enriched. There are documents with information on compost, raised beds and improving soil available from Cooperative Extension (O'Callaghan and Roberts, 2001).

## PLANT NUTRITION

When soils are high in organic matter, they usually provide good levels of nutrients for plants. At certain times however, such as the cool early spring, nutrients may be unavailable.

Conventional plant fertilizers are not used in organic practice, but items such as blood meal, cottonseed meal and fish emulsion are permissible. These have lower absolute levels of minerals, but they are taken up well by plants.

## NEXT - PROPER PLANT SELECTION

The most successful plants will be those that can withstand the growing conditions. When possible, a gardener should include varieties that are adapted to the local environment. It is also a good idea to use seeds and plants that are resistant to diseases and insects.

In general, seeds that are planted must be certified organic unless there is no alternative to conventionally produced seeds. Make sure to inspect seeds before planting to ensure that they are free of indications of disease organisms, such as mold or blotchiness.

Before putting a plant in a garden, whether it is a seedling or a fruit tree, it is important to examine it for signs of disease or infestation. A weak, diseased or infested plant will have difficulty surviving and may even be a source of problems for others in the garden. In general, the leaf color should be a rich green, leaves should not be limp, there should be no indication of insect eggs, mildews or spots on the undersides of leaves, etc.

Transplants should be planted at the appropriate time and season. At high temperatures for instance, certain vegetables like lettuce will produce an inedible flower stalk rather than tasty leaves. Vegetables that are grown for their fruits (melons, tomatoes, etc.) may suffer chilling injury when temperatures go below approximately 45° F. Weakened plants will be less able to withstand pest attack, whether it is from bacteria, fungi, viruses or insects.

Organic standards do not permit the use of seeds or plants that have been genetically modified ("bioengineered").

For a guide to the best times for planting vegetables in the Mojave, see O'Callaghan and Roberts, 2001.

## CROP ROTATION

If one type of plant is consistently placed in the same location, the potential for infestation by insects and diseases (particularly soil-inhabiting ones) that prey on that plant is increased. Crops should be rotated, even in a small garden. The same crop or type of crop should not be planted year after year in the same space.

## WEED CONTROL

Weeds cause problems because they compete successfully with desirable plants for light, water, nutrients and space. If weeds do emerge, it is important to remove them as early as possible. Pulling or hoeing weeds while they are very small will minimize their effects. It is particularly important not to let annual weeds go to seed, as they tend to produce enormous numbers of seeds.



Because the use of synthetic herbicides (weed killers) is not permitted in organic production, organic gardeners often rely on mulch in addition to cultivation as their primary means for weed control. Mulch can be any covering over the soil. In addition to decreasing the weed population, mulch may reduce evaporation and help maintain a more even soil temperature, depending on its composition.

Landscape cloth blocks light from getting to weed seeds, and this prevents them from germinating. In the past, black plastic was placed on the soil, but this has contributed to environmental pollution. It should be avoided in organic growing.

Other mulches, such as straw, block light, keep soil temperatures cooler, and help maintain soil moisture. These mulches should be kept a few inches away from the bark of woody plants, however, as the moisture may promote disease on trunks.

Killing plants by the use of acetic acid (concentrated vinegar) has been found effective, and preparations of "Garden Vinegar" may be available at garden centers.

## DEALING WITH PLANT DISEASES

A healthy, vigorous plant is likely to be more resistant to disease. Many organic practices are aimed at preventing disease by improving plant vigor. Not crowding plants permits air to circulate around them. Good air circulation makes the plant a less inviting target for disease-causing organisms and provides enough light for plants to grow. Many plants have been bred for resistance to disease, and seed packages generally give information about the plants' resistance. For instance, tomato seed packages will often carry the letters, V, F, T, N, which indicates that these plants will be resistant to verticillium wilt, fusarium wilt, tobacco mosaic virus and root knot nematodes.

Synthetic fungicides cannot be used in organic practice, so cleanliness of the plant's environment is also extremely important. While there are many ways that plant diseases can be spread, two are particularly important. The first is through plant debris. If a diseased plant is found, it should be removed, not only from the soil, but also from the garden. Leaving it on the ground only increases the risk that nearby plants or those planted later in the same space, will be affected. Planting garlic around the planting bed has been found to decrease the incidence of some fungal diseases.

Humans are another important means for spread of plant problems. Equipment and clothing (particularly gloves and shoes) should be kept clean. Tools, benches and pots can be washed with a bleach solution of one part bleach to nine parts water.

## INSECT PESTS

As with so much else in organic gardening, **prevention** is the most important facet of insect control.

- Keeping the garden weed-free decreases hiding places for insect pests.
- Removing infested plant parts from the garden and surrounding areas is important.
- Rotating crops in the garden reduces the opportunity for insect infestations to develop and increase over time.
- Placing row covers on beds decreases the amount of eggs that can be laid on young plants.
- Using vegetable and fruit varieties that are resistant to insect pests.

In southern Nevada, aphids pose a problem. These are sucking insects, which also transmit viral diseases. Generally, they can be removed by hosing plants with water.

While synthetic insecticides are not used in organic practice, certain compounds are permitted:

- Preventing insect infestation on fruit trees is accomplished by spraying dormant oil on trees before bud break in early spring.
- Insecticidal soaps are effective and safe for humans and pets.
- Biological controls such as *Bacillus thuringensis*, lacewings and parasitic wasps are available at many garden supplies.
- Botanically derived insecticides such as pyrethrums, garlic, rosemary oil, and capsaicin (hot pepper) are available now at most garden supply stores and can be used when cultural practices fail to control particularly difficult pests.

## IRRIGATION

The national standards do not recommend or prohibit any form of irrigation. Proper irrigation may be important in limiting disease. An organic grower should be sure to use the most efficient and ecologically responsible method available to provide sufficient, but not excessive, water to the crop.

## CONCLUSIONS

Organic gardening requires more than merely limiting the use of synthetic pesticides and fertilizers. It is a comprehensive system of improving soils, selecting plants, providing high nutrient levels and reducing levels of pests. Creating a growing environment with these conditions will reduce the need for synthetic fertilizers and pesticides.

## REFERENCES

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**UNR Extension**  
Clark County, Main Office  
8050 Paradise Road, Suite 100  
Las Vegas, NV 89123  
702-222-3100

[extension.unr.edu](http://extension.unr.edu)

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