

Chapter 7: Maintaining your water-conserving garden

Topics to be covered in this chapter

- I. Maintenance in a water-conserving landscape
- II. Using fertilizers
- III. Pruning
- IV. Weeding and weed control
- V. Insect and disease control
- VI. Water-saving maintenance practices

Definitions

Bud break: projection on stem of undeveloped shoot, leaf, and/or flower.

Growing season: the period from early spring to late summer when plant growth occurs.

Herbicides: chemical agents used to destroy or inhibit plant growth.

Leaching (of fertilizers): the movement of fertilizers in the soil below the root zone. Leached fertilizers are wasted and might find their way into the groundwater, where they might have adverse environmental effects.

Maintenance: keeping the landscape and plants well cared for and in a healthy condition.

Pesticides: legal poisons that kill plant-infecting organisms by contact or ingestion.

Pruning: cutting off parts or branches of a shrub or tree to improve its shape or growth.

Shearing: the uniform cutting or clipping of plant materials with large scissors or shears.

Slow-release fertilizer: fertilizing materials (natural or synthetic) that require microbial, chemical, and/or physical breakdown to become available to plants.

Water stress: a condition that occurs when a plant's demand for water exceeds the supply.

Weed: aggressive, prolific, exotic species that are opportunistic and grow obstinately in exposed soil.

Introduction

Proper maintenance of your water-conserving landscape is very important to ensure the optimum performance from your garden, but it does not have to be labor-intensive. Gardeners often tend to over-fertilize, over-water, and over-prune in a traditional garden. In your water conserving landscape, keep your plants healthy, but do not encourage new growth at all times. Fertilizing less often and with less fertilizer, pruning lightly when necessary, and irrigating wisely, will help you obtain a beautiful and low-maintenance garden.

I. Maintenance in a water-conserving landscape

By following the instructions and guidelines provided in the previous chapters concerning water conservation in the landscape, you will have a beautiful landscape that not only saves water and money, but also a landscape that requires minimal maintenance. This chapter explains maintenance practices that will help keep your garden in optimum shape.

II. Using fertilizers

Maintaining your water-conserving landscape will result in fertilizing less often, and with less fertilizer -- which will keep your plants healthy but will not encourage new growth at all times. Use fertilizers when you want to encourage growth, but note that this will increase your plants' water-use and pruning requirements.

Fertilizer types

There are two kinds of fertilizers: organic and inorganic.

Organic fertilizers can be natural (i.e. derived from animal and plant sources) or synthetic (i.e. composed of carbon-based structures). Organic fertilizers generally are not soluble in water. Instead, they depend on microorganisms for release, and thus release nutrients more slowly.

Inorganic fertilizers are derived from natural mineral sources. They are highly soluble and release nutrients very quickly, but have a higher fertilizer burn and leaching potential.

- Use inorganic fertilizers on plants showing a nutrient deficiency, because these fertilizers release nutrients rapidly and uniformly. Organic fertilizers release nutrients less uniformly and more slowly, and thus need to be applied less frequently.
- Inorganic fertilizers come in liquid or granular form. Granular fertilizers are also available as slow-release types.
- If available, use fertilizers that provide nitrogen in a slow-release form, such as sulfur-coated urea, urea formaldehyde, IBDU (isobutylene-diurea) or methylene urea. Slow-release type fertilizers generally cost more than soluble all-purpose garden fertilizers, such as an 8-8-8 or 10-10-10 (the percentages in the ratio represent nitrogen, phosphorus, and potassium, respectively); these last longer, since they release nutrients gradually.

Slow-release fertilizers

Slow-release fertilizers derive from natural or synthetic organic, or coated materials. Slow-release sources may require microbial, chemical, and/or physical breakdown. The advantages of slow-release fertilizers are that nutrients are not made available to the plant all at once, thus reducing the risk of fertilizer burn; also fewer applications are needed, therefore reducing the risk of leaching or pollution.

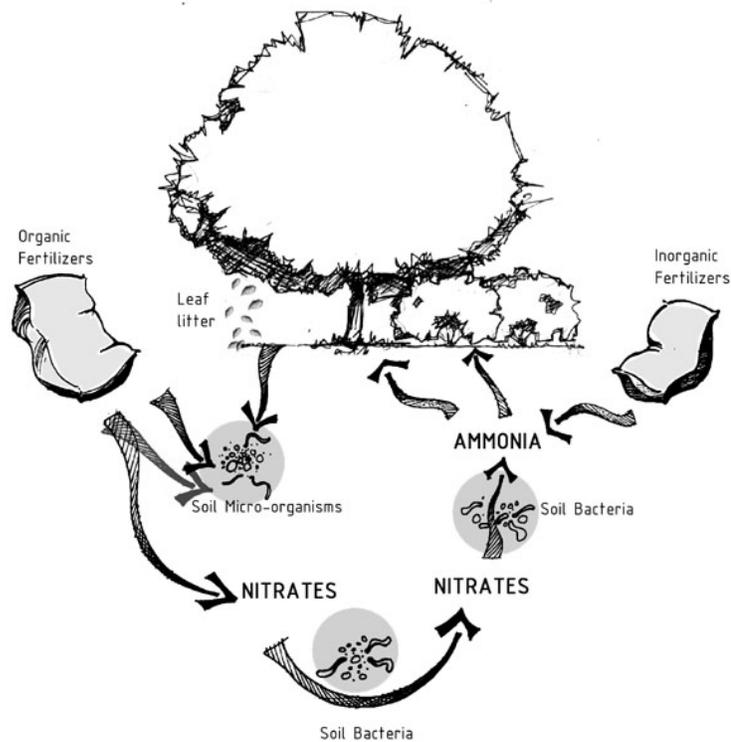


Fig. 7.1: Nitrogen sources for plants.

- Most nurserymen grow specific plants and consequently use a high nitrogen fertilizer. In a water-conserving landscape, however, use a low-nitrogen fertilizer. Nitrogen promotes *rapid* growth – which would be undesirable, because more growth would require more watering. Also, over-fertilization reduces root growth in favor of shoot and leaf growth, thus reducing overall drought resistance. A low nitrogen fertilizer with a 5-10-10 or a 2-10-10 ratio is recommended.

When to fertilize

- Drought tolerant plants usually do not require fertilizers, unless nutrient deficiencies occur.
- In general, most soil is fertile as is the case for trees and shrubs, because mycorrhizae (special fungi that live in and on plant roots) help plants exploit larger volumes of soil. Avoid over-watering, soil compaction, excessive fertilizing, as well as exposure to harmful chemicals and pollution, since all of these may harm the mycorrhizae fungi and other useful microorganisms.
- Every plant part - leaf, flower, fruit, stem, or root - removed from the soil takes some nutrients with it. It therefore is advisable to allow plant residue to remain in the soil and to decompose in place.

- Unless otherwise advised by a professional, fertilizers should not be applied to more mature trees or shrubs.
- Fertilizers replenish soluble salts. If at any time the soil becomes deficient in any one of the numerous minerals (such as nitrates as a source of nitrogen, phosphate as a source of phosphorus, and compounds containing potassium, calcium, iron, magnesium and aluminum), fertilizers can replace them.
- Base the need for fertilizers on plant performance, on visual clues such as lack of vigor, sparse foliage, light green or yellow leaves, twig die-back, gradual slowing of growth, and on a comparison with adjacent plants. Before assuming nutrient deficiency, consider other external environmental effects (such as disease or pollution) that might adversely influence plants.

Nutrient deficiencies

- Both nitrogen and iron deficiencies can produce chlorosis – yellowing of plant tissues.
- Nitrogen deficiency causes the older leaves of the plant to become chlorotic first; new leaves may follow.
- In case of iron deficiency, plant leaf veins remain green, but the rest of the leaf turns yellow. New leaves become chlorotic first, older leaves may follow.

- In the spring, when growth is lush, there is no advantage to forcing growth with fertilizers. If fertilizers are necessary, they should be applied just before new growth begins (late winter and early spring).

General guidelines for fertilizer application

- Fertilize before a scheduled irrigation, not after the soil is already wet; and always irrigate sufficiently when applying fertilizers, as nutrients must be dissolved in water to enter the roots of the plant.
- Watering too deeply can cause nutrients to move below the root zone and result in leaching. Reduce leaching by watering carefully.
- Use discretion when applying any fertilizer. Too much potassium inhibits the uptake of nitrogen and calcium. Too much nitrogen stimulates lush leaf and stem growth, reduces root development, lowers carbohydrate reserves, and increases susceptibility to environmental stresses such as disease. In general, do not use more fertilizer than is recommended.

Watch out!

Fertilizers dissolve in soil water. If too much fertilizer is applied, high salt concentrations outside the plant's roots can cause the plant cell membrane to reverse the flow of water, and this will result in what is known as "physiological drought." "Fertilizer burn" or scorched foliage is the visible symptom of this form of dehydration within the plant.

- Herbicides combined with fertilizers are not recommended, since they can produce a mixture that is harmful to the plants.
- Read and follow the label directions for application rates and guidelines, and do not use more fertilizer than is recommended. However, note that accepting a lower growth rate for your plants can minimize or even supplant the use of fertilizers. Also, once plants are established, reduce the amount of nitrogen applied, as well as the application rate and frequency of application. The application rate that is stated on the fertilizer label is intended for optimum growth, and thus can be reduced after establishment.

III. Pruning

In a water-conserving garden, you don't have to prune as much as you would in a traditional garden. If plants are located in areas with adequate space, the need for regular pruning will be greatly reduced. However, some minor pruning may be necessary at times and can be beneficial to plants if done properly.

When to prune

- Plants should not be pruned immediately after planting, except to remove dead, diseased, or protruding branches.
- Light pruning may be carried out anytime, if proper pruning techniques are followed. For deciduous plants, heavier pruning should be carried out when plants are dormant (after leaf drop in the fall or before bud break in early spring); for evergreen plants, late fall or early spring is best.
- In general, avoid pruning when plants appear stressed or during periods of prolonged heat.
- Pruning stimulates growth, which requires additional water. Therefore, reduce pruning during dry periods.
- Once the landscape is established, you will have to carry out maintenance pruning. Of course, if you select the proper plant for its location and provide it with adequate space, this will greatly reduce the need for pruning, or will even eliminate it.

General guidelines for pruning

- Use plants with a 'free' form. Such shrubs and plants grow as they will – as they would in nature - thus avoiding the need for constant trimming into more formal

shapes. With these looser, more natural shapes, pruning becomes an occasional matter.

- Prune dead twigs or branches; these do nothing for the plant.
- Branches along the lower trunk of trees should be allowed to grow for at least two years before removal, because they encourage strong trunk growth, and protect the tree from sunburn and reduced wind resistance.
- Branches that are rubbing against each other should be trimmed.



Fig. 7.2: Branches rubbing against each other should be removed.

- When pruning trees, retain the strongest branches and remove damaged, weak, crossed, or narrow angled branches. Also, remove shoots growing from the ground or base of the plant (known as suckers).
- Remember that trees should never be stubbed (to cut off or remove the top of the tree), since that will greatly impede their vertical growth.
- Pruning helps rejuvenate an older shrub that no longer flowers.
- Where pruning is needed to encourage dense growth, trim off a terminal bud ("a process known as pinching"). This will encourage lateral branches to sprout, thus promoting the development of a bushier, more compact shrub.
- Many plants eventually will send up long shoots (nurserymen call this getting "leggy"). Such leggy growth should be removed to ensure uniform plant growth.

- If the plant starts to look too thin and woody, trim it back to about a third to a half of its original height. If you ever are in doubt about what to remove, don't remove it.

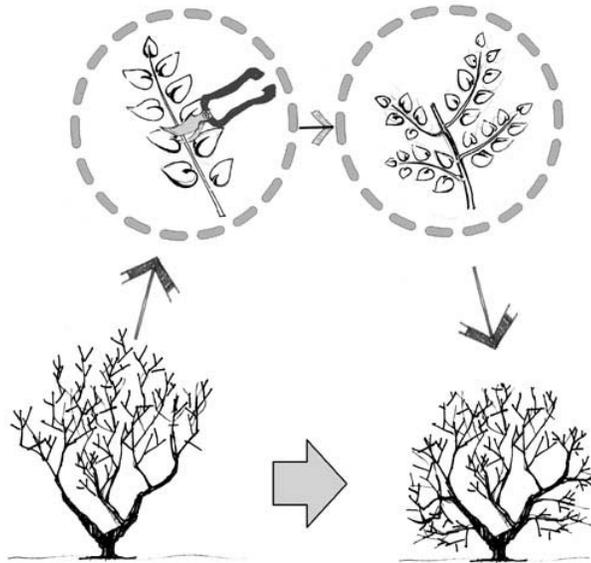


Fig. 7.3: Pinching a terminal bud encourages dense growth in a shrub.

- If shearing or hedging is carried out for shrubs, keep the bottom of the shrub wider in diameter than the top, and thin out some of the branches. This allows greater sunlight to penetrate and encourages internal leaf growth.

- Use the proper pruning tools and make sure that they are clean, by dipping them in a 10% bleach/water solution between cuts to avoid spreading disease.



Fig. 7.4: A selection of pruning tools.

- Keep your tools sharp, so that they can make a nice cut – normally a slanted cut, at about a 45-degree angle, and above the bud.

- Always make smooth cuts and avoid crushing plant tissues.
- Use a pruning saw for branches that are more than 2.5 cm thick.

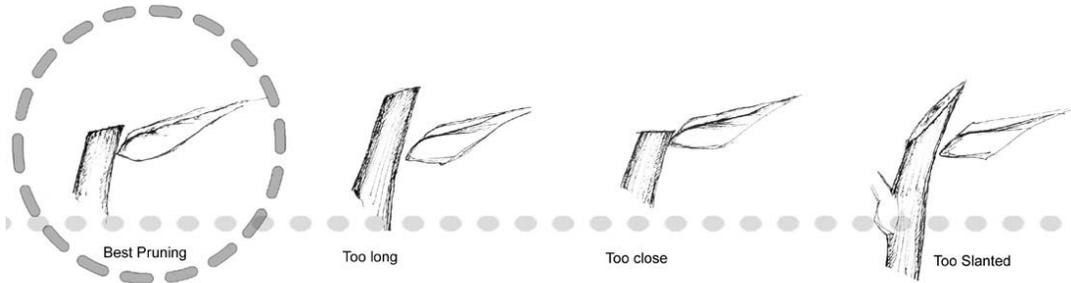


Fig. 7.5: Pruning cuts should be made at a 45-degree angle above the bud.

IV. Weeding and weed control

- When trying to conserve water, keep in mind that any plant out of place can be called a weed, because it is using water and nutrients intended for other plants.
- Eliminate weeds before they set seed, to reduce future weed problems.
- Mulches can reduce weed seed germination by preventing their exposure to sunlight.
- Common ways of removing weeds include hand picking, which is simply to dig up the weeds, either with bare hands or with a hoe. Manual weed removal can be effective when weed populations are low.
- In extreme cases, chemical control through herbicides may be necessary. Herbicides are chemicals that kill plants and can be effective with weeds. However, if you use herbicides you must follow the accompanying label directions carefully.

Beware

Any herbicide that kills weeds can just as easily also damage and kill your desired plants.

V. Insect and disease control

- A pest is any organism that is out of control (weeds, insects, fungi, bacteria, and viruses), and that destroys the health, minimizes the vigor, or ruins the aesthetics of the plants in your landscape.

- Healthy plants have a natural ability to ward off insects and diseases, but urban environments can increase the potential for insect problems in trees and shrubs, due to urban stress conditions. These include extreme temperature and moisture fluctuations, air pollution, and acid rain.
- Shrubs and trees in poor condition are likely to attract insect pests and are susceptible to damage when attacked.
- Incorrect maintenance practices also create plant stress, thus making plants susceptible to insects and disease. To prevent these problems, follow proper planting, pruning, irrigation, and weed control practices.
- Careful diagnosis is a necessary first step for dealing with any problem.

Ask the following questions to help in making a proper diagnosis:

- Is the plant getting enough or too much water?
- Has the plant been over-fertilized or sprayed with pesticides or herbicides?
- Are insects visible on the plant?
- What is the maintenance history of the plant?

- Note the list of symptoms and consult a qualified person to help address the problem.
- Scout for insect and disease pests before you spray. Control pests when they begin affecting the appearance and overall health of a plant.
- Target your control measures to the affected plants and avoid spraying the entire landscape, if the pest problem is confined to a small area.
- Alternative methods of dealing with pests and disease include what is known as the Integrated Pest Management (IPM) program. The basic principle behind IPM is to monitor the plants to see if there is a problem and to determine if and when the infestation has reached an intolerable level. Improving plant health in general often enables the plant to deal with the problem on its own.

Ask the following questions when deciding whether or not to control a pest:

- What part of the plant is being affected? Is it a part that is to be harvested? If so, you should not use a pesticide.
- Can the pest be ignored?
- Is the plant healthy enough to tolerate the damage? Vigorously growing plants can tolerate some leaf loss without permanent damage.
- If the pests are plants, will they seed and become more invasive?
- If the pests are insects, are they young enough or is it early enough in the season for these to potentially cause more injury later on? If this is the case, a more aggressive

response may be necessary. Many times a pest is detected when it is in its terminal stage and about to stop feeding. By then it is too late to do anything that would be of any use.

VI. Water-saving maintenance practices

- Do not let weeds compete with plants for water: scout the landscape regularly and make sure that weeds do not take over. Hand weeding, chemical herbicides, and mulches will help keep weeds in check.
- Make every drop count: where irrigation systems are used, check nozzles and emitters regularly to see if they are operating efficiently and are delivering the right amount of water in the right locations.
- Let your plants tell you when they need water: learn to identify the symptoms shown by plants under water stress.

Water stress symptoms

- Shrubs will turn a gray-green color and wilt.
- Trees will show premature fall color and shed leaves.
- Lawn grass will turn a dull gray-green color, and the blades will wilt and roll inward.