



THE UNIVERSITY OF GEORGIA
COOPERATIVE EXTENSION
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BMP

In the Landscape



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BMP in the Landscape

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LANDSCAPE INSTALLATION AND MAINTENANCE PRACTICES FOR WATER CONSERVATION

Research has shown that if you properly select, install and maintain ornamental plant, you greatly increase their survival and performance in the landscape. Following sound planting and care procedures for ornamentals also will help conserve water. Properly sited plants that have been carefully planted and maintained usually require less irrigation and are less prone to diseases and insects. The following **BMPs** (Best Management Practices) not only conserve moisture in the landscape but will assure overall health and vigor of the ornamental plants.

BMPs

1 Fall and winter planting of woody ornamentals and herbaceous perennials is recommended because there is less demand for water and nutrients by the top and more energy and food for root growth. While the crown of the plant shuts down for winter, the roots continue to grow. A plant installed during cooler temperatures is less stressed because the plant has time to develop a strong root system.

2 Prepare the planting bed properly by deep tilling to a depth of 8 to 12 inches. When planting individual plants, dig a wide planting hole to provide a favorable rooting environment. A large planting hole and deep tilling will allow roots to expand more easily and develop a strong root system that will better sustain the plant during times of drought.

3 Add appropriate amendments to the planting bed (when necessary) to improve the physical properties of the soil — water retention, water infiltration, drainage — or to enhance its mineral and microbial content. Soil amendments contribute to an overall healthier plant environment, allowing easier root development and fewer soil-related problems.

4 Avoid placing granular general-purpose fertilizers in the planting hole, because these products can dehydrate the roots of plants. Add only slow-release fertilizer to the planting hole if fertilizer is needed. General-purpose fertilizer added to the planting hole could cause root injury and greater loss of water in the plant.

5 Give special care to seasonal color beds because of their high demand for water and maintenance. Planting seasonal color on well-amended, raised beds will lead to a healthier and more water efficient landscape.

6 Apply 3 to 5 inches of mulch on the soil surface after planting to conserve moisture and help maintain a uniform soil temperature while preventing weeds that compete with plants for light, water and nutrients. Fine-textured mulches prevent evaporative water loss better than coarse-textured mulches. For best water efficiency, mulch out to the drip line of plants, but do not pile mulch deeply against the trunk.

7 Watch for moisture stress symptoms before deciding when to irrigate. An abnormal gray-green color or obvious wilting are good indicators that a plant needs moisture. Watering only when plants truly require it will help develop a deep, strong root system and acclimate plants to survive during drier periods.

8 The best time to irrigate is at night or early in the morning to conserve moisture and avoid evaporative loss of water. Watering between the hours of 9 p.m. to 9 a.m. is more efficient to the plant and does not lead to any increase in problems such as disease.

9 Deep watering encourages strong, healthy root systems that are water efficient. Avoid light, frequent irrigation that encourages shallow rooting. Infrequent but thorough watering is the best formula for a healthy landscape. Water long enough to penetrate the soil to a depth of 6 to 8 inches.

10 A soil test provides the best gauge for fertilization requirements in the landscape. A healthy landscape is more water efficient. Proper nutrition enables plants to better use available water and to conserve it during dry periods. Over-fertilization increases plant stress during times of drought.

11 Slow-release fertilizers provide a more even uptake of nutrients by the plant, resulting in a more uniform growth rate, which is more water efficient. Excess nitrogen or high nitrate fertilizers cause rapid growth and an increased demand for water. Slow-release fertilizers are actually more cost efficient, decrease the chance of root burn, and allow the plant a season's source of nutrition.

12 Avoid over-fertilization. Over-fertilization can cause excessive plant growth and additional water requirements.

13 Avoid fertilizing during periods of limited rainfall or high temperatures. Additional fertilizer can cause root burn and other damage on drought stressed plants.

14 During times of severe drought, cut back annual and perennial flowers several inches to reduce moisture loss. Reduction in the plant's overall canopy will cut down on water loss through transpiration.

Installation

Correct planting procedures are essential to establishing a water efficient landscape.

BMP 1: Fall and winter planting of woody ornamentals and herbaceous perennials is recommended because there is less demand for water and nutrients by the top and more energy and food for root growth.

In general, fall is the ideal time to plant most woody trees, shrubs, vines and groundcovers as well as herbaceous perennials. Temperatures are moderate and less stressful to plants than the hot temperatures of late spring and summer. Plants require less frequent irrigation and are less likely to suffer sun scorch or heat-related stress. In addition, fall planted ornamentals continue to develop a strong root system even after their tops have gone dormant. Fall and winter establishment will benefit the plant tremendously the following spring as the well-established root system can readily funnel water and nutrients to the above-ground growth. Ornamental plants that have a cold requirement

(flowering bulbs) or are sensitive to frosts and freezes (annuals) are best planted according to recommended planting dates.

BMP 2: Prepare the planting bed properly by deep tilling. When planting individual plants, dig a wide planting hole to provide a favorable rooting environment.

An ideal soil for optimal plant health contains air space for good drainage and good water hold capacity. It contains some organic matter that supplies nutrients and improves soil structure and texture. A poorly drained and compacted soil can shut down root systems and may result in wasted water through runoff. A poorly drained soil can also lead to disease problems later, shutting down a plant's ability to function properly.

Tip — Soil drainage can be checked by digging a hole approximately 15 inches deep by 15 inches in diameter and filling it with water. If water is left standing in the hold after 1 hour, the site may drain poorly. If water remains in the hole for several hours, site improvements are needed.

Deep tilling the entire planting bed to a depth of 8 to 12 inches is perhaps the best and most cost-effective way to improve the planting site. Tilling will break up and loosen the existing soil, allowing easier plant root penetration and water infiltration. Deep tilling will help a plant get established more quickly with a healthier root system that can handle moisture extremes.

When planting solitary plants in undisturbed soil, make the planting hole as large as possible to encourage new root growth. Dig the hole at least twice the diameter of the root ball. Set the top of the root system level with the soil surface or slightly higher if the soil is prone to settling. Planting too deeply will cause root suffocation, but shallow planting may cause root death from dehydration.

Before planting balled-and-burlapped plants, cut the wire or cord around the trunk and pull back the burlap from the top one-third of the root ball. Otherwise, the burlap may serve as an impediment to root growth. When planting container-grown plants that are root bound, use a knife to make shallow, vertical slits around the root ball in four to six locations and spread out the root system within the planting hole. This will allow water to readily penetrate the root ball while encouraging new root growth.

BMP 3: Add appropriate amendments to the planting bed (when necessary) to improve the physical properties of the soil – water retention, water infiltration, drainage – or to enhance its mineral and microbial content.

Most Georgia soils are low in organic matter, so it is usually beneficial to incorporate an organic amendment such as compost during the tilling process. Apply at least 4 inches of the amendment on the soil surface and thoroughly incorporate it into the native soil to a depth of 12 inches.

Tip – Research has shown that amendments added to individual planting holes are not helpful and can in fact be harmful to the plant. They may act like a sponge, holding too much moisture in the hole. They may also encourage the roots to stay within the confines of the hole instead of growing outward into the native soil. Backfill these plants with the native soil.

There are two broad types of soil amendments: organic and inorganic. Organic amendments come from something that is or was alive. Inorganic amendments are either mined or man-made. Examples of organic amendments include compost, peat moss, manure and biosolids.

Organic amendments improve water retention, oxygen infiltration and nutrient-holding capacity of a soil. They also provide beneficial fungi and bacteria, earthworms and other living organisms that improve nutrient availability and aeration of the soil.

Examples of inorganic amendments include vermiculite, perlite, pea gravel, shale and sand. They are used to improve the structure and drainage of a soil. Unlike organic amendments, these products have little nutritional value.

Hydrogels are synthetic polyacrylamide or starch-based organic compounds capable of holding several hundred times their weight in water. They improve the water-holding capacity of a soil while improving soil aeration as they swell and shrink according to fluctuation in soil moisture. In the landscape industry, they are used in containerized plantings and seasonal color beds, but their effectiveness and benefit to woody ornamentals has yet to be determined.

Tip – Do not add sand to clay soils; this changes the structure of the soil to something similar to concrete.

Other considerations when selecting soil amendments include:

- how long the amendment will last in the soil (coarser type amendments typically will last longer than fine ones);
- cost, availability;
- salt content and effect on soil pH.

BMP 4: Avoid placing granular general-purpose fertilizers in the planting hole; they can dehydrate the roots of plants.

Granular general-purpose fertilizers such as 10-10-10, 8-8-8 or 16-4-8 are chemical salts and may be caustic to the tender roots of newly planted ornamentals. They may actually dehydrate the roots and cause the plant to demand more water in the planting hole. Use general-purpose type fertilizers on the soil surface once the plant is established. Spread the fertilizer away from the base of the plant out to the drip line area. Do not pile the fertilizer to one side of the root system, since this might cause roots to burn.

In general, fertilizers are not a necessary ingredient in the planting hole. The plant will have enough stored energy in its roots to get established. One exception to this rule is seasonal color plantings. It is a common practice in the landscape industry to place slow-release fertilizer in the planting hole beneath annuals and perennials. This assures a season-long supply of nutrients and results in stronger growth compared to broadcast application.

BMP 5: Give special care to seasonal color beds because of their high demand for water and maintenance.

Seasonal color beds are short-lived and shallow-rooted, and they demand a uniform supply of water and nutrients for optimum growth in the typical landscape. Organically amended beds are essential to promote good health and water transfer for annuals. On new beds, add 4 inches of organic matter to the soil surface and incorporate it to a depth of 12 inches.

Raise the planting bed approximately 10 to 15 inches above grade to assure good drainage and improve the visual appeal of the planting. Raised beds assure good filtration and movement of water in the soil, prevent possible water-logged conditions, and result in a healthier rooting environment.

A slow-release fertilizer added to the planting hole results in uniform growth throughout the season and a healthy, fibrous root system that makes best use of available water. Additional fertilizer may be needed to provide nutrition throughout the growing season.

BMP 6: Apply 3-5 inches of mulch on the soil surface after planting to conserve moisture and help maintain a uniform soil temperature while preventing weeds that compete with plants for light, water and nutrients. Fine-textured mulches prevent evaporative water loss better than coarse-textured mulches.

Mulches have many benefits in the landscape. They hold moisture in soil, prevent weeds, inhibit certain soil-borne foliar diseases, insulate the roots of the plants from temperature extremes, and provide a protective barrier around the plant to keep lawn mowers or string trimmers away. They also provide a pleasing background contrast for plants.

Common mulches include pine straw, pine bark nuggets, hardwood chips and cypress shavings. Fall leaves also are a good mulch, provided they are shredded prior to use. Grass clippings are not a good mulch because they tend to mat down and inhibit the flow of water and nutrients into the soil. They may also introduce weeds into the planting bed.

Inorganic mulches such as rocks, gravel or marble are good soil insulators, but they are not good choices for Georgia landscapes because they absorb and re-radiate heat in the planting bed, increasing water loss from plants.

Apply mulches 3 to 5 inches deep. When mulching trees, remember that the root system of a mature tree may spread two or three times the canopy width, so mulch as large an area as possible.

Tip – Too much mulch around plants is a barrier to oxygen, water and nutrients and may encourage diseases or rodent damage.

Landscape fabrics are sometimes used under organic mulches to prevent weeds and to serve as an added barrier to moisture loss. Make sure these fabrics are free from soil on top, since weeds may germinate.

LANDSCAPE MANAGEMENT PRACTICES FOR WATER CONSERVATION

Irrigation

BMP 7: Watch for moisture stress symptoms before deciding when to irrigate. An abnormal gray-green color or obvious wilting are good indicators that a plant needs moisture.

Most healthy, established wood ornamental plants in the landscape can survive weeks without supplemental

irrigation. In fact, overwatering during periods of limited rainfall and the root rot that results have killed more plants than drought.

Your best guide in determining when to water is the plant itself. Wilting or a pale grayish-green color are the most common symptoms of moisture stress. Some plants such as annuals and herbaceous perennials may need water more often than woody ornamentals because of their limited root systems. By targeting irrigation to only those plants in the landscape that need water, you save water, time and money and you also avoid potential disease or insect problems from overwatering.

BMP 8: The best time to irrigate is at night or early in the morning to conserve moisture and to avoid evaporative loss of water.

Irrigating during mid-day causes evaporative water loss and inefficient water use. Irrigating between 9 p.m. and 9 a.m. avoids evaporative water loss.

BMP 9: Deep watering encourages strong, healthy, water-efficient root systems. Avoid light, frequent irrigation that encourages shallow rooting.

Frequent, light irrigation encourages shallow rooting. As a result, roots dry out more quickly and the plant's continued demand for water increases.

When irrigating, apply enough water to wet the soil to a depth of 8 to 10 inches to promote deep root growth. Remember to change irrigation frequency and amount according to changes in rainfall patterns. Make certain automated systems have a rain sensor that prevents them from operating during rain.

Apply water slowly using a hand-held hose, drip or trickle irrigation, micro-sprinklers or an ooze hose. The amount and frequency of irrigation depends on the type of plant, the soil type and the time of year. Plants in sandy soils normally require more frequent irrigation than those growing in clay soils.

Tip – Approximately 1 inch of water is required to wet clay soils to a depth of 8 inches.

Fertilization

BMP 10: A soil test provides the best gauge for fertilization requirements of the landscape. A healthy landscape is more water efficient.

Soil sampling through your local county Extension office is the best and most affordable way to assess the

fertilizer needs of plants. In addition, a soil test is the only scientific way to determine whether lime is needed to adjust soil pH. Applying lime without a soil test may cause nutritional problems. Plants cannot use fertilizer properly unless the pH is adjusted correctly.

Proper nutrition assures optimum plant growth and resistance to diseases, insects and environmental problems. Plants receiving proper nutrition also will be more water efficient. They have healthier, larger root systems that can better sustain the plant during periods of limited rainfall.

BMP 11: Slow-release fertilizers provide a more even uptake of nutrients by the plant, resulting in a more uniform growth rate. Excess nitrogen or high nitrate fertilizers cause rapid growth and an increased demand for water.

Because slow-release fertilizers are coated and release nutrients over time, plants grow at an even rate instead of in bursts of new growth. This leads to a more water-efficient plant. There is also less chance of salt injury from slow-release fertilizers, as the protective coating only releases a small amount at a time.

Slow-release fertilizers are also more cost effective than traditional soluble fertilizers because they supply nutrients over an extended period.

BMP 12: Avoid over-fertilization. Excessive fertilizer can harm the plant's water efficiency, health and the environment.

Fertilizers are salts, and excess amounts can damage plants by drawing water from the root zone. Plant cells in these roots begin to dehydrate and collapse, and the plant roots can become "burned" or dried out to a point where they cannot recover.

Over-fertilizing can cause water quality problems, as excess fertilizer can enter storm drains and eventually streams and rivers through run-off and leaching. Leaching is the effect of nutrients being washed through the lower soil layers and into the groundwater supply.

The frequency of fertilization depends on the type of plants, the age of the plants, and the type of fertilizer used. In general, most established woody ornamentals need only one application of a slow-release fertilizer

per year. Annuals benefit from light monthly applications of a water-soluble fertilizer or the use of a slow-release fertilizer.

Newly planted ornamental trees and shrubs will benefit from light additions of fertilizer in three applications during the growing season (March, May and July).

BMP 13: Avoid fertilizing during periods of limited rainfall or high temperatures.

Plants absorb fertilizer when they are actively growing. Fertilize most plants during the early spring from the time they break dormancy until they taper off in their growth in fall and go dormant. It's a good idea to irrigate if possible immediately after an application of fertilizer.

During periods of drought, reduce the amount of fertilizer applied and the frequency of application in non-irrigated areas; plants may be stressed and do not need to increase their canopy from nutrient uptake.

Pruning

BMP 14A: During time of severe drought, cut back annual and perennial flowers to reduce moisture loss.

If irrigation is impossible because of watering bans, cutting back herbaceous annuals and perennials that are wilting will reduce water loss from leaves by taking pressure off the root system. Less water will then be lost through the leaves of the plant. Be sure to provide mulch to help with moisture retention in the soil.

BMP 14B: Maintain pruning equipment in good order to improve the health and water efficiency of plants.

Dull hand pruners will not cut cleanly and will cause cut branches to be frayed. Frayed branches will not recover as quickly as those cut cleanly by sharp blades and will allow more water loss. In addition, poorly cut branches can be a site for disease penetration that can weaken the plant. Learn to sharpen tools properly with a stone, and keep them clean and oiled. Buy the best tools you can afford.

ADDITIONAL RESOURCES

Web Sites:

<http://pubs.caes.uga.edu/caespubs/horticulture/horthome.htm>
<http://ohioline.osu.edu/lines/hygs.html>
<http://www.hgic.umd.edu>

Books:

Georgia Gardener's Guide by Erica Glasener and Walter Reeves
Your Florida Landscape by Dr. Robert Black and Dr. Kathleen Ruppert
Month by Month Gardening in the South by Don Hastings and Chris Hastings
The American Horticultural Society – Pruning and Training by Christopher Brickell and David Joyce

For more information, visit <http://extension.caes.uga.edu/>

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