UF IFAS Extension UNIVERSITY of FLORIDA

Florida-Friendly Landscaping™ PROGRAM

UF/IFAS PEER REVIEWED ENH1353
doi.org/10.32473/edis-ep617-2022

Efficient Irrigation for Florida-Friendly Edible Landscapes[1]

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Figure 1. Drippers are an efficient way to water edibles, such as these herbs, in containers. Credit: Jacqlyn Rivas, UF/IFAS

Introduction

A Florida-Friendly edible landscape utilizes nine core principles to conserve water and soil resources. This article focuses on Florida-Friendly Landscaping™ (FFL) principle #2, watering efficiently, which promotes water conservation and plant health in the edible landscape. A consistent and efficient supply of water is essential for edible crops, including fruits, vegetables, and herbs. Edibles require regular watering for optimal production. Following guidance by FFL principles can help us water in the most efficient way possible, allowing Floridians to have good, edible landscape food production and conserve water resources. This Ask IFAS publication is written for Florida gardeners, homesteaders, and other horticulturalists interested in planting and establishing edible landscapes and improving those landscapes by conserving water. This publication will provide guidance for choosing the ideal irrigation system for edible cropping systems as well as general tips for conserving water in edible landscapes.

Irrigation Management in the Edible Landscape

Edible plants have specific watering requirements and will benefit from proper irrigation management. Watering efficiently requires knowing soil type and the plants' watering needs and planning irrigation schedules based on those needs. Without planning, this can be difficult in the edible landscape because established ornamentals require less water compared to vegetables. Irrigation requires attention in this unique landscape due to varying plant water requirements.

How Much Water Do My Edible Plants Need?

Edible plants need just the right amount of water. Excessive or insufficient water can cause stress to the plant, fruit drop, and reduced vegetative and root growth, as well as promote disease and pest susceptibility. Plants require water for photosynthesis and transportation of essential nutrients. Vegetables require about one to two inches of water per week depending on the plant, season, and soil type. Irrigate when the first one to two inches of soil surface are dry. Use your fingers to physically check the soil or use a soil moisture sensor. Edibles have critical watering periods that support growth stages, like germination, flowering, and fruiting. Use a proactive approach by regularly monitoring plant appearance and adjusting watering frequency or duration as needed. This can reduce problems in the vegetable garden and increase harvest.

Seedlings and younger plants will require more frequent watering, especially when evaporative rates are high. As plants mature, watering duration should increase, and frequency should decrease. In other words, larger plants should be watered longer but less often. Both underwatering and overwatering can disrupt root systems and affect nutrient absorption. Use Table 1 to determine

general watering needs for edibles during their growth stages.

Underwatering

Without adequate water, plants can become stressed and stunted and produce poorly. Plant wilting is a primary symptom of underwatering and indicates plant distress. Prolonged underwatering will result in nutrient deficiency, indicated by leaf discoloration, and may result in plant death. For example, fluctuating soil moisture may leach calcium from the soil or limit calcium absorption, causing blossom end rot in tomatoes. Fruiting plants may drop their flowers and fruits during times of water/drought stress. Plant wilting can also occur from excessive heat on hot sunny days, even when plants are hydrated. Check your plants in the morning or evening to see if they reflect appropriate moisture.

Overwatering

Overwatering may exhibit the same symptoms as underwatering, but the soil will be wet or saturated. Overwatering is likely to cause diseases and increase pests, such as insects and weeds. With too much water, the soil can be depleted of oxygen and lead to root rot and other problems. Excessive water may be caused by poorly drained soil and compaction. Certain fruits/vegetables like tomatoes and carrots may split due to excess or uneven watering. Some varieties are more prone to splitting. Too much water can lead to localized nutrient loss and pollute local water bodies through leaching or runoff. This is only an issue with nitrogen and phosphorus, two nutrients that negatively affect waterbodies.

Types of Irrigation

There are many types of irrigation, and more than one method might be required in the edible landscape because the plants have different water requirements. Rainfall should be the primary form of watering the garden. Using a rain gauge can help track rainfall. Use of harvested rainwater, such as rain barrel water, should only be for nonedible ornamental plants due to physical, biological, and chemical contamination. For additional information on the topic, please refer to *Edible Landscaping Using the Nine Florida-Friendly Landscaping™ Principles*: https://ask.ifas.ufl.edu/publication/EP594.

When rainfall cannot satisfy plant water requirements, supplemental irrigation for edibles should be used. The three common types of irrigation are high flow/volume in-ground, hand watering, and microirrigation (Figure 2). Turfgrass, ornamentals, and edibles require different amounts of water and should be in separate zones. Establishing ornamentals and edibles requires frequent watering, and local ordinances may limit watering days and use. Check with your local Water Management District and local municipalities for watering use restrictions: https://floridadep.gov/water-policy/water-policy/content/water-management-districts.



Figure 2. This dripline has two loops around this fruit tree to provide even watering around the root zone. Credit: Luke Harlow, UF/IFAS

In-Ground Irrigation

In-ground irrigation (traditional/high volume/overhead) is used to irrigate turfgrass and is generally not recommended for ornamentals or edibles. Water streams from pop-up sprayers and rotors can damage delicate plants. Additionally, plant interference can cause uneven water distribution in turfgrass and landscape beds. Rotary nozzles are low volume and can be used for edibles integrated into large landscape areas and in orchards where there are groundcovers. If turfgrass is part of your edible landscape, convert to water-efficient nozzles.

Hand Watering

Hand watering can be a very efficient way to water edibles. It involves a user holding a watering device like a hose or watering can. A hose nozzle with multiple watering patterns such as shower or garden settings works well. Check the soil to ensure that the water has permeated several inches into the soil after watering. Although useful for young plants, light surface watering will encourage shallow roots and make plants less drought tolerant. Deep watering in the root zone is relative to the plant you are growing (6" for seedlings and smaller crops, 24" for shrubs and fruit trees) is better and encourages deep roots. Use a timer to avoid overirrigating.

Hand watering is good for transplants, for establishing new crops, and in smaller gardens, and it can also be a great method for maintaining more mature crops. It can be restrictive in larger gardens and during times of drought. Consider combining this watering method with microirrigation for larger gardens. If the soil gets too dry, hand watering may be needed to apply a larger volume of water to rewet the soil.

Microirrigation

Microirrigation is a low-volume, low-flow system that delivers water to the root zone. It can be a very efficient method of watering when used appropriately. Benefits include

- Reduced weed populations
- Prevention of plant disease by wetting the soil instead of wetting the foliage (Figure 3)
- Reduced evaporation and direct application of water to the soil. Microirrigation systems usually function at 15 to 30 psi (pounds per square inch). To avoid blowing out lines or emitters, use a pressure regulator. To learn more about microirrigation, see *Microirrigation for Home Landscapes*: https://ask.ifas.ufl.edu/publication/AE524.



Figure 3. This dripline directly waters the soil and is ideal for squash, which are prone to fungal issues when leaves remain wet.
Credit: Jacqlyn Rivas, UF/IFAS

Watering Edibles with Microirrigation

Consider using different types of microirrigation for different fruits and vegetables, herbs, and fruit trees. Types of microirrigation include dripline, drip emitters, microsprays, and microbubblers (Table 2).



Figure 4. Dripline
Credit: UF/IFAS



Figure 5. Drip emitter.
Credit: UF/IFAS



Figure 6. Microsprinkler.
Credit: UF/IFAS



Figure 7. Microbubbler.
Credit: UF/IFAS

Dripline

Drip emitters are preinstalled into in-line drip tubing. This system requires the least amount of setup. Drip tubing has a lower flow rate compared to drippers, bubblers, and microsprays and is available in ¼-inch or ½-inch diameters. Depending on manufacturer, emitters may be spaced every 6, 9, 12, 18, or 24 inches and have a flow rate of 0.5 to 1 gallon per hour. In-line drip tubing is ideal for row crops and raised garden beds. If customized spacing is required, consider using self-piercing drippers installed into ½-inch supply tubing instead of in-line drip tubing.

Drip Emitters

Drip emitters or drippers are good options for potted vegetables and vegetables that do not like wet foliage, because water sitting on the leaves can cause plant disease problems. Drippers are attached to ¼-inch distribution tubing, secured with a stake, and set by the root zone. No spraying or misting occurs. Flow rates can range from 0.5 gallons per hour to 6 gallons per hour for low-flow drippers. Medium-flow emitters are ideal for watering larger shrubs and trees and can have a flow rate of 7–24 gallons per hour. Some drippers are self-piercing and can be directly installed into ½-inch supply tubing for row crops, fruiting shrubs, and trees.

Microsprays

Microsprays are available in different watering patterns and distribution rates up to 40 gallons per hour. Likewise, microsprays also vary in the diameter of area they water. Most range 2–4 feet, but some can go up to a diameter of 25 feet. Because microsprays irrigate a larger area, they can spray outside of raised garden beds and increase the growth of weeds. Sprayers can also cause drift by producing mist when water pressure is too high. Sprayers with downward streams are less likely to cause drift.

Microsprays can be good options for cool-weather crops such as carrots, radishes, and greens (Figure 8). They are not good options for vegetables like squash that are prone to fungal issues. Taller vegetables like mature collards can block microsprays. This plant interference causes uneven water distribution, resulting in over- and underwatered plants. When purchasing microsprays for vegetable gardens, look for sprayers that have an adjustable diameter and consider adjusting or using taller stakes/risers. Manufacturers have developed variations of microsprays and may include microjets, misters, spinners, or sprinklers. Some products include factory-installed stakes and on/off valves. Most products function between 10 and 30 psi. Overlapping coverage can reduce dry spots and watering duration.



Figure 8. Microsprays are used to water kale in this small garden.
Credit: Jacqlyn Rivas, UF/IFAS

Bubblers

Bubblers are versatile and can emit up to 26 gallons per hour depending on the type. Water emission can vary from multistreams (Figure 9) to umbrella-like streams in 180- and 360-degree patterns. Microbubblers are good options for container gardens. Bubblers with higher flow rates are ideal for establishing larger fruit trees and shrubs. Most bubblers are adjustable and can be increased, decreased, or turned off. Bubblers work well for vegetables in raised beds, shrubs, trees, and plants such as blueberries.



Figure 9. The microbubblers can be adjusted to apply more or less water to this pepper plant.
Credit: Jacqlyn Rivas, UF/IFAS

Florida-Friendly Landscaping™ Water-Saving Strategies

- **Right Plant, Right Place.** Select the right plant for the right place in your landscape based on your site conditions. Grow varieties known to produce well in Florida, like 'Everglades' tomato or 'Seminole' pumpkin. See the *Florida Vegetable Gardening Guide* (https://ask.ifas.ufl.edu/publication/VH021) for recommended vegetable varieties and *Dooryard Fruit Varieties* (https://doi.org/10.32473/edis-MG248-2022).
- **Choose drought-tolerant plants.** Examples of plants that can withstand water stress include lemongrass, rosemary, loquat, mulberry, fig, and persimmon. See the *FFL Plant Guide* at https://ffl.ifas.ufl.edu/plants.
- **Design an efficient irrigation system.** Choose the appropriate irrigation system for your edibles by checking product specifications, including pressure, run length, and flow rate. Mixing zones to include multiple forms of microirrigation is not recommended. See *Basic Tips for Designing Efficient Irrigation Systems*: https://ask.ifas.ufl.edu/publication/AE539.
- **Adjust your irrigation system.** Retrofit sprinkler systems to use microirrigation or water-efficient nozzles. Adjust irrigation controllers seasonally based on plant water requirements and local water restrictions.
- **Conduct periodic maintenance.** Frequently check for irrigation leaks, damage, and clogging. See *Frequency of Residential Irrigation Maintenance Problems*: https://ask.ifas.ufl.edu/publication/AE472.
- **Retain soil moisture.** Amend soil with compost to improve water retention. Use a 2"–3" layer of settled mulch for edible shrubs and trees, and a light layer of pine straw, pine needles or hay for vegetables. See *Recycling Organic Materials to Improve Your Florida-Friendly Edible Landscape*: https://ask.ifas.ufl.edu/publication/ep599.
- **Water early.** The best time to water is early in the morning between 4 a.m. and 6 a.m. Most ordinances require watering before 10 a.m. or after 4 p.m. to minimize water loss to evaporation.

Summary

Edible landscaping has a specific goal—to provide a food source—and gardeners must use a proactive approach to increase success. Hand watering and microirrigation are both water-efficient approaches that can assist gardeners with plant maintenance as water demand, population, and gardening interests increase. With proper planning and irrigation practices, gardeners can mitigate plant health issues, increase harvest, and maintain a healthy, edible landscape.

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Table 1. Watering Needs for Edible Crops during Their Growth Stages.

Plant Type	Examples	Relative Water Need	Notes
Microgreens, Sprouts	Seeds, sprouts, young transplants	High	Needs frequent watering in small amounts
Annuals (Fruits and Vegetables)	Green beans, sweet peas, cucumber, carrot, strawberries, tomato, lettuce	High	Regular water needed throughout the growing season
Long-Lived Vegetables	Kale, collards, pumpkin, sweet potatoes	Low	Can handle water stress after establishment
Established Perennials	Pineapples, grapevines, blueberries, blackberries, hops	Low	Need steady water for optimal production, especially during flowering and fruiting
Mature Herbs	Basil, rosemary, chives, oregano, thyme, parsley, fennel	Low	Herbs have varying water needs and soil moisture preferences/tolerances; research herb varieties before planting
Established Fruit Trees	Avocado, apple, mango, papaya, banana, peach	Low	Need steady water for optimal production, especially during flowering and fruiting

Table 2. Microirrigation Types and Uses.

Names	Description	Uses	Notes
Dripline Drip tape Drip tubing In-line drip Drip hose	Emitters are factory installed and available in 6”, 9”, 12”, 18”, or 24” spacing, no hole punching required Flow: 0.4–1 GPH	Row crops, longer rows, larger gardens	Hard to detect clogged emitters, dripline may need to be cleaned, flushed, or replaced periodically
Drip emitters Drippers	Emitters need to be plugged into main tubing line or “spaghetti” tubing Flow: 0.5–10 GPH	Container gardens, larger spaced plants	Labor needed to install emitters into tubing
Microsprays Microjets Microsprinklers	Small spray usually set on a stake 6”–12" above ground Flow: 1–30 GPH	Container gardens, small gardens, raised beds, fruit trees	Extra material in stakes and tubing to attach spray to lateral line; use spray heads with same flow for uniform watering
Microbubblers Bubblers Shrubblers®	Dribbling emitters may be on stake or punched directly into tubing Flow: 0–50 GPH	Containers, individual plants, larger spaced plants, shrubs, fruit trees	Extra material in stakes and tubing to attach spray to lateral line; most have adjustable flow rates

[1] This document is ENH1353, one of a series of the Department of Environmental Horticulture, UF/IFAS Extension. Original publication date February 2022. Revised May 2025. Visit the Ask IFAS website at https://ask.ifas.ufl.edu/ for the currently supported version of this publication. *To learn more about creating and maintaining attractive landscapes that protect Florida's water and natural resources, visit ffl.ifas.ufl.edu/*.

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