



MasterGardeners
of Maricopa County



COLLEGE OF AGRICULTURE & LIFE SCIENCES
**Cooperative
Extension**
Maricopa County

CONTAINER GARDENING IN THE LOW DESERT



Presented By: Laura Ward, Arizona Master Gardener

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We can plant and harvest something fresh to eat every day of every month here in the low desert!



Winter: Greens, Peas, Cauliflower, Root Veg



Summer: Peppers, Eggplant, Melons, Cukes, Purslane



Find here: <https://extension.arizona.edu/pubs>

Ten Steps to a Successful Vegetable Garden

Gardening with vegetables can be fun and can provide delicious and highly nutritious fresh food. Watching and working with plants can add a new dimension of enjoyment to life. Bring an awareness of the wonderful world of nature in the backyard. The marvels of nature will have special personal meaning when nurturing a small seed into a colorful productive plant with your own hands. These

accomplishments can be obtained regardless of the size of garden. A few plants or a large plot will give rewarding experiences for both young and old. The path to a successful vegetable garden is not difficult or long. Ten carefully taken steps will produce many enjoyable moments and an abundant harvest of fresh vegetables during much of the year.

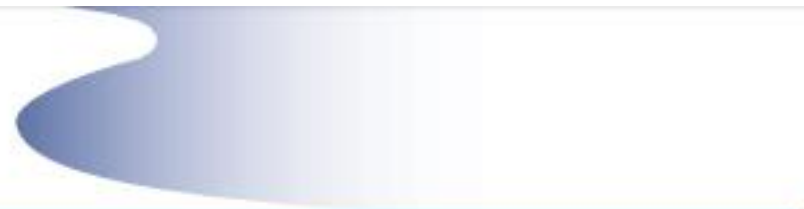
Step 1

Select a good location

Choose an area with plenty of morning sunlight and some afternoon shade. Most vegetables, especially fruiting types,

with alkali salts or infested with hard to control weeds such as Bermudagrass, nutgrass, Johnson grass or bindweed.





Find here: <https://extension.arizona.edu/pubs>

Container Gardening In The Southwest Desert

Kelly Murray Young



These agaves in boldly colored containers add visual interest to the landscape.



Why Container Garden?

- Space: Any size space with access to enough sunlight
- Management: Weeds, pests, water and soil are more easily managed in containers.
- Mobility: Containers can be moved, including indoors or to a greenhouse
- Irrigation: can be managed separately for different containers
- Ease: less bending and kneeling

What To Grow in Containers?

- Any plant! If a plant's water, light, space, and nutritional needs are met.
- Root vegetables like need very large containers.
- Tall plants will also require a deep and wide container for root anchoring.
- A stake or trellis may be needed to provide support for tall plants, such as tomatoes and vines.

Select a Good Location

We can make shade, but not sunlight

- 6-8 hours of sunlight per day
- Morning sun is generally best in summer
- As much sun as possible in winter
- The sun moves. Gardens are possibly sunny in some seasons, but not others, because the sun changes angles and intensity.

Sunlight

Adequate

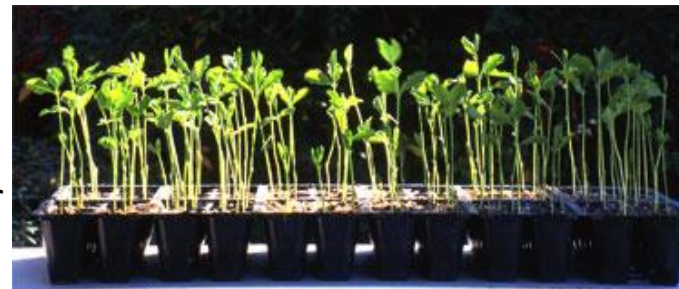
- Bushy, vigorous plants
- Deep green color
- Reach maturity in a timely fashion
- Successful crop production



Healthy Seedling

Inadequate

- Plants are leggy, weak, not vigorous, pale
- Slow to mature
- Few flowers
- Low production of fruit
- Plants are targets for insect pests and disease



Leggy, paler Seedlings

Shade Tolerance

- If you have areas that don't receive the required sunlight, choose vegetables that tolerate partial sun
- Winter greens, beets, cucumbers, peas.
- Fruiting plants, such as tomatoes, peppers, melons and citrus have much higher light requirements

Other Location Considerations

- Easy to access:
 - Near a water source
 - Hauling and storing soil amendments, fertilizers, compost and produce in/out
 - Near composting station, if desired
 - Access to tools and equipment

Plan The Layout

- Determine the garden configuration
 - Amount of space available
 - Container sizes and types
 - On the ground or raised
 - A mix of some or all the above
 - Integrated into the landscape
- Start small; allow for expansion

Characteristics of Containers

- Containers heat up and cool down much faster than earth or raised beds - plants will need protection from heat and cold.
- In the winter, water the plants and then cover them with a cloth-based material before any expected frost.
- Summer requires shade (natural or shade cloth)
- Shade cloth must extend to the ground, to protect the roots as well as the foliage.

Characteristics of Containers

- Heat-sensitive plants benefit from a permanent shade cloth of +/- 50% rating during warm weather.
- Soils may have either faster or slower drainage in containers depending on the soil mix.
- Use a mixture that drains well and a container with drainage holes.

Container Size

- At least 1 foot deep, 18-24 inches across
- On wheels if possible
- Larger containers are better for plants, but more difficult for us.
- Choose a soil mix specific for container vegetable gardening
- Or make your own soil with a mix of compost, natural soil, container potting soil and vermiculite

Container Size

- Choose the largest pot you can manage, as the more dirt in the container, the longer it takes to heat and chill.
- Consider the size of the root system on the mature plant. Most vegetables can get by with 12-14” of soil, but 18-24” is better for root vegetables

Fertilizer vs. Compost vs. Mulch

- Fertilizer is a feed for plants
- Compost is a feed for the soil. It helps build healthy, living soil which in turn supports plants. Compost adds organic material to our soil, something which is naturally lacking in the desert
- Mulch is a top dressing used to help moderate soil temperatures and retain moisture

Container Types

- Avoid nursery pots. They are thin-walled and will transfer heat and cold quickly. If you must, paint them a light color to reflect the sun.
- Use a pot-in-a-pot, with a layer of insulation between the containers. Insulation can be made from straw, leaves or soil.
- Some planting pots have two walls and offer a bit of protection.

DIY Container Ideas

- Food grade 55-gallon drums cut in half make large containers. The barrels and be purchased for around \$25. They are sturdy, last a long time and can be obtained in white.
- Half-barrels will become very heavy when filled with a soil, so use wheeled base or dolly.
- Old buckets, bathtubs, drawers, sinks. You can be creative!
- If you make your pot, don't forget to add drain holes



Can be simply functional...



Or very attractive!



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Salt Accumulation

- Most tap water has a fairly high salt content. Every time we water plants with tap water, we add salt to the planting medium.
- Fertilizers are also salts, and as we fertilize our container plants, the salt increases.
- Excess salt is toxic to plants. Symptom of “salt burn” is a browning and death of the tip and/or edges of the leaves that is bordered by a yellow “halo”.

Salt Accumulation

- To remove (leach) accumulated salts from the containers, periodic applications of large amounts of water are necessary.
- Be sure that the excess water during these leaching events drains quickly and easily
- Softened water should not be used to water plants because of the high salt content.
- Rainwater and water from A/C condensate lines has low or no salts

Fertilizing

- Plants grown in the ground have access to a larger volume of soil and the nutrients... nutrients in containers can be used up quickly.
- Apply a weak solution of a complete fertilizer with micronutrients frequently.
- Most commercial potting mixes contain fertilizer which should suffice when plants are first started

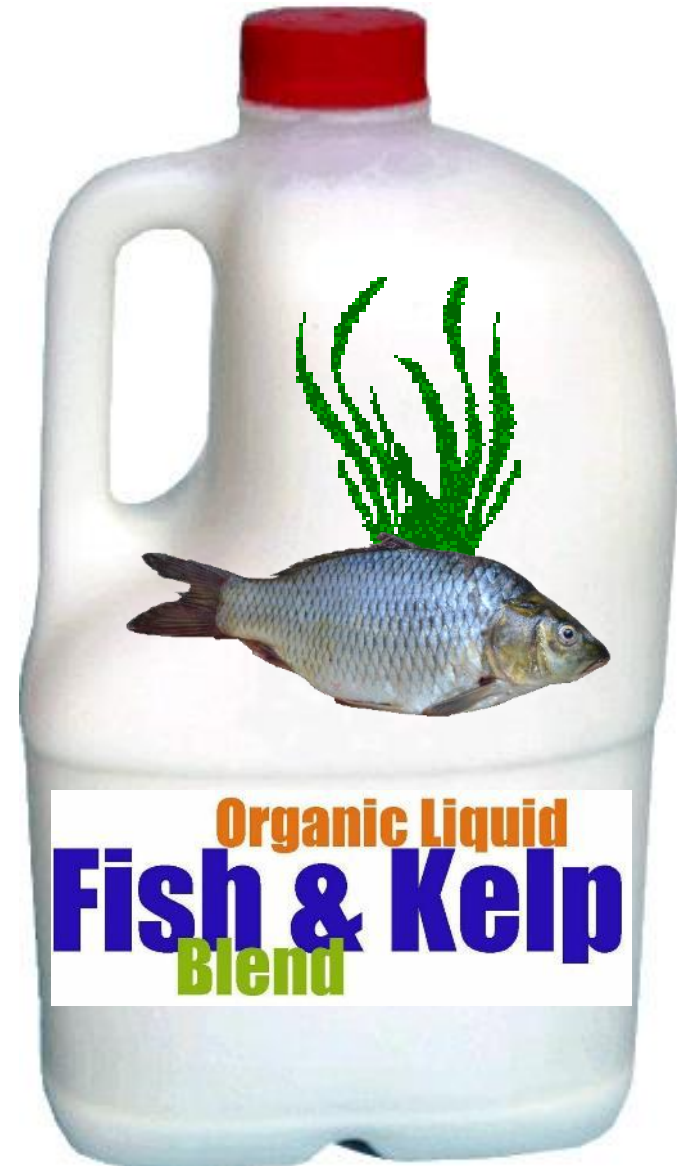
Fertilizers

- Macro nutrients: N-P-K
 - Nitrogen - green and leafy, **volatile**
 - Phosphorous - flowers, roots
 - Potassium - fruits, flowering, stems
- Store in a cool, dry place, sealed and labeled, use quickly
- Synthetic or 'organic'

Organic Options

Animal or vegetative based

- Urea
- Blood meal
- Bone meal
- Worm castings
- Seaweed/kelp
- Fish-based
- Compost



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Micronutrients

- Micronutrients can be used up in potting soil, and may need to be added occasionally
- Heavily amend the soil in containers when rotating crops.
- Add some native clay. It contains micronutrients and helps hold water.

Characteristics of Raised Beds



- Raised beds, though not very mobile, have some of the advantages of container gardens:
 - Soil and water can be managed
 - Height may make less bending required
- Raised beds suffer less temperature extremes, tend to hold water and nutrients better than containers.



Determine What to Plant

- Make a list of crops you want to grow
- Choose crops you like to eat
- Choose veggies that are more expensive in the stores
- Choose crops you are curious about; try something new
- Choose produce that tastes best eaten fresh

Determine When to Plant

- Refer to the Publication *AZ1005: Vegetable Planting Calendar for Maricopa County*
- Select from your list crops
- Make your layout
- Note planting dates, days to maturity
- Read the instructions
- If starting from transplants, sow seed indoors or a greenhouse 6-8 weeks before planting date

Determine When to Plant

Evaluate soil temperature

- If we are having warmer or cooler than normal weather, soil temp is more important than the calendar.
- The calendar is based on “average” weather and temperatures.
- Use a soil thermometer and measure 1-2 inches below surface (about the level the seed will be planted)

SOIL TEMPERATURE CONDITIONS FOR VEGETABLE SEED GERMINATION

Alphabetical				By Temperature			
Crop	Minimum (°F)	Optimum(°F)	Maximum (°F)	Crop	Minimum (°F)	Optimum(°F)	Maximum (°F)
Asparagus	50	75-85	95	Garlic	32	65-85	95
Beans, Lima	60	75-85	85	Leeks	32	65-85	95
Beans, Snap	60	75-85	95	Lettuce	32	60-75	85
Beets	40	65-85	95	Onions	32	65-85	95
Broccoli	40	60-85	95	Parsnips	32	65-75	85
Cabbage	40	60-85	95	Spinach	32	65-75	75
Carrots	40	65-85	95	Beets	40	65-85	95
Cauliflower	40	65-85	95	Broccoli	40	60-85	95
Celery	40	*	*	Cabbage	40	60-85	95
Chard, Swiss	40	65-85	95	Carrots	40	65-85	95
Com	50	65-95	105	Cauliflower	40	65-85	95
Cucumbers	60	65-95	105	Celery	40	*	*
Eggplant	60	75-85	95	Chard, Swiss	40	65-85	95
Garlic	32	65-85	95	Parsley	40	65-85	95
Leeks	32	65-85	95	Peas	40	65-75	85
Lettuce	32	60-75	85	Radishes	40	65-85	95
Melons	60	75-85	105	Turnips	40	60-95	105
Okra	60	85-95	105	Asparagus	50	75-85	95
Onions	32	65-85	95	Com	50	65-95	105
Parsley	40	65-85	95	Tomatoes	50	65-85	95
Parsnips	32	65-75	85	Beans, Lima	60	75-85	85
Peas	40	65-75	85	Beans, Snap	60	75-85	95
Peppers	60	65-75	95	Cucumbers	60	65-95	105
Pumpkins	60	85-95	105	Eggplant	60	75-85	95
Radishes	40	65-85	95	Melons	60	75-85	105
Spinach	32	65-75	75	Okra	60	85-95	105
Squash	60	85-95	105	Peppers	60	65-75	95
Tomatoes	50	65-85	95	Pumpkins	60	85-95	105
Turnips	40	60-95	105	Squash	60	85-95	105
Watermelons	60	75-95	105	Watermelons	60	75-95	105

Cooperative Extension-Sacramento County

<http://sacmg.ucanr.edu/files/164220.pdf>



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Our Seasons: 365 Days

- We have four planting seasons: fall, winter/early spring, summer, and monsoon
- Vegetables can be grown and harvested every day of the year in Arizona
- Consider some native crops during monsoon season (check Native Seed Search)
- Fall and spring seasons support tomatoes, but start them indoors, as they rarely make it through the heat and the cold.

Seeds

- Obtain high-quality seeds from a reliable source.
- The seed packet label ~~usually~~ sometimes has information about the cultivar, the year the seeds were packaged, instructions for planting in our area, and days to germination.
- Purchase only enough seed for one season. The likelihood of germination decreases with age.
- With older seed, consider doing a germination test before a full planting

The leaves of this attractive herb have a spicy flavor which makes green salads, tomato and cheese dishes, soups and omelets extra delicious.

Online Code 7333



CARE & MAINTENANCE CUIDADO Y MANTENIMIENTO

DAYS TO GERM	5 - 10	DIAS A GERMINAR	5 - 10
DEPTH	1/4 in.	PROFUNDIDAD	6 mm
SPACING	10 in.	ESPACIO	25 cm
HEIGHT	18 - 24 in.	ALTURA	45 - 61 cm



May - June Mayo - Junio
April - July Abril - Julio
March - June Marzo - Junio
February - May Febrero - Mayo

Start seeds indoors, 6 to 8 weeks before the last frost. Sow in open ground well exposed when soil is warm. Thin when plants are a few inches tall. Transplant to garden after frost. Harden off before transplanting.

Comience a sembrar en interiores, 6 a 8 semanas antes de la helada. Siembre en terreno abierto bien expuesto cuando el terreno esté cálido. Reduzca cuando las plantas tienen unas cuantas pulgadas de alto. Transplante al jardín después de la helada. Aclimátele antes de transplantar.



Plantation Products LLC., 202 S. Washington St. Norton, MA 02766 plantationproducts.com

PACKED FOR 18 SELL BY 12/18 R1

Native True Greek Oregano Seed/SEARCH

Taste the best strain of any oregano we have found! Deep, genuine, oregano flavor! Pinkish-white flowers decorate this herb that doubles as a perfect ground cover with soft gray-green leaves. 12-18" tall. Contents ± 200 seeds (0.1 g).

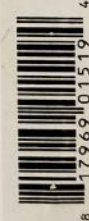
Herb

Origanum vulgare hirtum. Most herbs are easy to grow and are quite happy in poor, gravelly soils. Besides being essential to fine cuisine, herbs are used medicinally and are effective insect repellents.

Culture: Plant in fall through early spring in the low desert, spring through summer in colder climates.

Seed Saving: Herbs are insect pollinated and members of the same species will cross. Harvest dried seed stalks, and hang upside down for complete drying. Crush to remove seeds, and winnow off chaff.

Acceptance of these seeds is an agreement that they will not be used for commercial breeding purposes with a patent outcome unless there are written agreements with the originators of the seeds in Native Seeds/SEARCH's collection



Germ Date: 02-28-2018 Sell By: 02-28-2019 id.13734 3061 N Campbell Ave, Tucson, AZ 85719

Sustainable Seed Company

Organic Early Wonder Beet

33-60 days, 2 g SKU 16168

Early Wonder beet has roots that are smooth, half-flat, bright red and about 3" in diameter. Seems to do a bit better in Southern climates than other beets, but remember beets are a cool weather crop. One of the best beet varieties for greens, the tops are fast growing, sweet, flavorful, and grow upwards of 18".

PLANTING TIPS (for more info: www.SustainableSeedCo.com)

Can be planted in the early spring or midsummer. Soak seeds overnight in damp towels before planting for good germination. Plant seeds 1" apart and thin weakest seedlings to desired spacing. Keep soil evenly moist to prevent roots from getting woody. For longer harvest, stagger plantings every 2-3 weeks.

Packed for: 2017

Lot: 95100

Buying Plants

- Buy from a reputable source
- Healthy root ball just filling the container
- Good proportion of plant to root
- Plant intact, dark green, healthy stem
- Some of the “big box” stores and nurseries pay no attention to our climate, soils and planting dates, they just sell what they get in stock.

Growing From Seeds

- Irrigate frequently but shallowly to germinate and maintain young seedlings
- Protect young seedlings from predation



Seed Planting

- Label each plant
- Follow suggested distance between plants to allow for growth
- Space seed as package recommends
- Insure good seed /soil contact
- Thin as necessary



Buying Transplants

- Plants pre-grown in containers to be transplanted into larger pots
- Some plants need 6-8 weeks head start to bear a crop
 - Tomatoes, eggplants, sweet potatoes, peppers, broccoli, cauliflower, cabbage, brussels sprouts...

Advantages of Purchased Plants

- Quicker to see 'the garden'
- 3-8 weeks quicker to harvest
- No uncertainty about germination
- If you have missed the seed-starting window, purchase plants to "catch up"

Disadvantages of Purchased Plants

- Restricted to varieties available
- Plants may not be optimal for our area
- Plants may not be available at optimal time for planting
- Labeling may prove disappointing
- More expensive

Planting a Transplant

- All soil prep should be finished
- Prior to planting, water plants well
- Plant in the evening or on a cloudy day
- Dig a planting hole the depth of the root ball
- Gently remove the plant from container and set into hole in the new container

Planting a Transplant

- Backfill to cover root ball
 - plant level with the soil
- Gently firm soil around the root ball
- Water plants into their new home!
- Fiber or peat pots: remove them gently (they don't decompose as advertised)
- Protect newly planted plants from pests, hot sun, wind, cold

Planting Rule

Always plant level with the soil

- Tomatoes are the exception to the rule
- Tomatoes grow roots along their stems
- Bury most of the stem, leaving a few inches of plant above ground

Rotate your Crops

- Remember this: “Roots-shoots-beans-fruits”
- Rotating prevents depletion of nutrients.
- Planting the same crop in container multiple seasons greatly increases the possibility of disease, such as Verticillium Wilt or Fusarium
- Beans/legumes fix nitrogen in the soil, helping future crops.

Irrigation

- Container gardens and raised beds have different needs than ground level gardens
- Typically: Less water required per watering, but frequent watering sessions
- Soil type impacts the rate of water applied and the frequency of applications.
 - Sandy and gravely water drains quickly
 - Clay holds water

Irrigation

- Learn how long to run water to achieve desired depths, adjust frequency and *not length of run time*
- To keep down alkalinity and salts, use rainwater as much as possible. Our tap water is alkaline and high in Total Dissolved Solids (TDS) which includes salts
- Salts include not only sodium, but potassium, calcium, magnesium, chloride, sulphate, bicarbonate and carbonate

Pests and Problems

- Know the enemy!
- A-biotic or biotic?
- 2 , 4, 6, or 8 legged critters
- Wind and weather, climate, soils, irrigation

A-biotic Damage

- Wind, sun, salt, irrigation, frost, rain or hail as well as nutrient challenges. Result in:
 - Browning edges
 - Wilting
 - Poor growth
 - Leaf color changes
 - Sunburn
 - Spotting

Biotic: Insects

- **Always identify insects before treating**
- Few insects are pests
- Many pests are attracted to stressed plants



Use Least-Toxic Controls First

- Mechanical controls
 - Use row covers, screens, mulch; hand pick or spray off
- Remove damaged or diseased plants
Use least toxic pesticides first and only as a last resort. Follow all directions. Remember these can also affect beneficial insects such as bees.
- Plants can withstand some predation and still produce well

2 and 4-Legged Pests

- Birds, rabbits, domestic pets/animals.
- Build walls, erect fences
- Use hardware cloth as under layer for beds
- Use netting or light shade cloth for tenting threatened plants



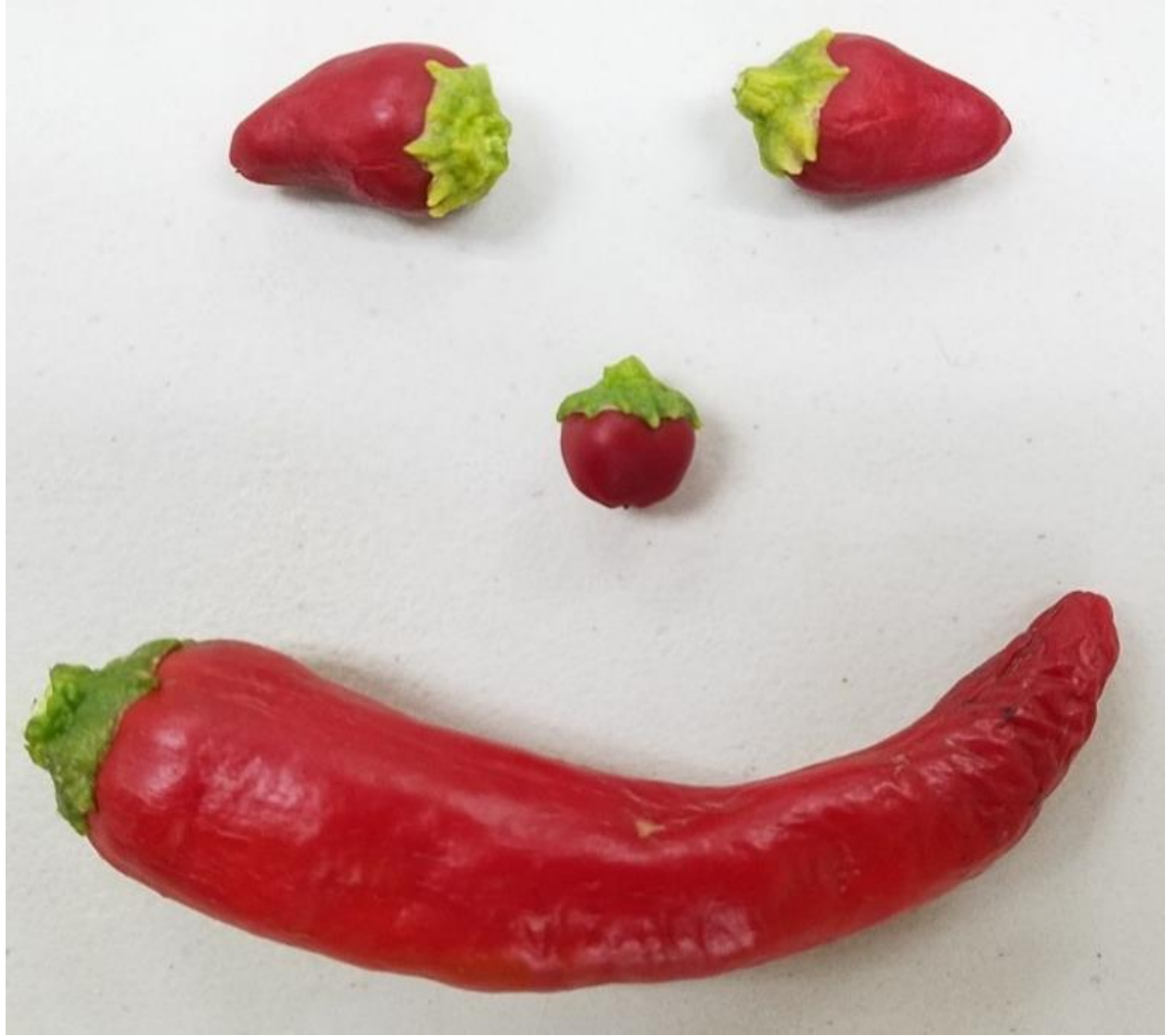
Harvest at Peak Quality

- Do not use grocery store produce as the gauge to judge your crop
- Refer to the days to maturity notes on seed packet!
- Harvest young, tender and often!
- Repeated harvest will encourage many veggies to set more fruits

Storing and Curing

- Handle your crop carefully
- Refrigerate after harvest
- Cure garlic, shallots, onions, sweet potatoes
- Store non-perishables in cool, dry, dark locations
- Share the bounty!





Maricopa County Extension Master Gardener Plant Help Desk

- The Maricopa County Extension Plant Help Desk provides research-based information to assist you with plant and pest problems.
- Email: maricopacountyplanthotline@gmail.com. Responses will generally be within a week
- Visit: 4341 E. Broadway Rd Phoenix, AZ 85040. Bring in a plant or pest sample. Location is in Southeast Phoenix, near Tempe.
- If a master gardener cannot answer your question, they will refer the question to University expert staff members.

Resources

- University of Arizona Extension Publications
<https://extension.arizona.edu/pubs>
 - AZ 1005: Vegetable Planting Calendar
 - AZ1435: 10 Steps to a Successful Vegetable Garden
 - And may, many more free gardening publications
- California Extension Publication GN154: Soil Temperature Conditions for Vegetable Seed Germination. sacmg.ucanr.edu/files/164220.pdf