

Ten Steps to a Successful Vegetable Garden



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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

What is an Arizona Master Gardener?

- A University of Arizona trained individual who completes a Cooperative Extension semester-long specialized course in gardening/horticulture.
- A non-paid volunteer who agrees to complete a specified number of volunteer hours and continuing education hours each year to remain certified.

What is an Arizona Master Gardener?

- County-specific and local. Each county extension office has their own program. Maricopa and Pinal Counties focus on our conditions in the low desert.
- The Master Gardener provides educational leadership in home gardening, landscaping, and irrigation.
- We may or may not be experts or “masters” at any or all horticulture topics, but we are trained to help you find science- and research-based information.



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.



STEP 1

SELECT A GOOD LOCATION

We can make shade, but not sunlight

- 6-8 hours of sun light
- 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.

The Importance of Sun

- Photosynthesis turns water and nutrients into growth
- No sun =
 - no photosynthesis
 - no growth
 - no produce

Sunlight

Adequate

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



Healthy
Seedling

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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

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Master Gardeners
of Maricopa County



THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES

Cooperative Extension

Microclimates

- Every yard has microclimates
- Cold Traps: Low-lying areas with poor circulation frequently collect cold air and dampness, particularly if the soil is poorly draining. These areas tend to be the first to frost
 - Look for patches of frost on fall and spring mornings.

Microclimates

- Heat Sinks: Pavement, stone, and buildings can absorb heat that radiates to surrounding areas. Drier soil, heat damaged plants. Use heat and drought tolerant plants here.
- Seasonal Variations: Deciduous trees can create sunny areas in winter and shady areas in summer.

Microclimates – Winter Sun

- On a winter day, evaluate your chosen garden spot several times throughout the day. See what parts of the yard or lot are receiving sunlight and for how long.
- From sunrise to sunset on the Winter Solstice in Valley, we receive less than 10 hours of light. The sun is also much lower in the sky, such that trees, other homes, and/or walls may be shading portions of the lot.



Garden Location Considerations

- Near a water source
- Workable soil
- Easy to access
 - Consider hauling soil amendments, compost and produce in/out
 - Composting
 - Access to tools and equipment

Soil at the Location

- Loose, fertile, level, well-drained soil is best.
- Conduct a soil structure evaluation
- Soil can be amended, but removing caliche...
- Avoid areas with alkali salts and hard to control weeds such as Bermudagrass, nutsedge, Johnson grass, etc.

Soil at the Location - Drainage

- Test drainage by digging a hole approximately one foot deep in dry soil. Fill hole completely, allow to drain, and fill again immediately. Monitor the drainage.
- Drainage is poor if any water is still standing 24 hours after the second filling.
- Do the test in the planting hole as it moistens the planting area to prevent dry soil absorbing water out of the root ball.

STEP 2

PLAN YOUR GARDEN LAYOUT

- Determine the garden configuration
 - Raised beds
 - Containers
 - On the ground
 - A mix of some or all of the above
 - Integrated into the landscape
- Start small; allow for expansion

Characteristics of Raised Beds



- Heat up, cool down and dry out more quickly than in-ground beds
- If possible have raised bed irrigation separate from in ground or containers
- More control over water, location and soil
- You can use a weed barrier, or not



Container Gardening

- At least 1 foot deep, 18-24 inches across
- On wheels if possible
- Well drained
- Near water source
- Choose a soil mix specific for container vegetable gardening...
- Or, make your own with a mix of compost, natural soil and container potting soil

Container Gardening

- 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.
- Ensure the cloth goes all the way to the ground, to hold in warmth and prevent frost infiltration.

Container Gardening

- In summer, both the foliage and the container need to be shaded from the afternoon sun
- Heat-sensitive plants benefit from a permanent shade cloth of +/- 50% rating during daylight.
- Soils have poorer drainage in containers due to the shallow depth and reduced capillary pull; therefore, use a porous planting mixture and plenty of drainage holes.

Container Gardening

- Avoid nursery pots. They are also thin-walled and will transfer heat and cold quickly. If you must use, paint 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.
- Add mulch to the top of the soil to protect against heat/cold, direct sun, and rapid evaporation.

Container Gardening

- Choose the largest pot you can obtain, 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" of soil, but 16"-18" is better for root vegetables

Container Gardening

- Food grade 55-gallon drums cut in half results in 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 a furniture dolly or other wheels if you may need to move them.
- Don't forget, if you make your pot, drill drain holes!



Ground Level Enclosed Beds

- Make the paths permanent
 - Mulch them well
- Dig and amend planting rows only
- Irrigate planting rows only
- Make rows and furrows...
- Or lower the surrounding soil and irrigate by flooding the whole garden



Row Garden Beds



Mini-farms!



If you have
the space,
go for it!

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

Selecting Varieties

- Use catalogs or shop online; avoid impulse purchases. Box stores will sell you the incorrect plants for the time of year.
- Low days to maturity: we have multiple short seasons, unlike most of the country
- Select cultivars that provide the desired size, color, and growth habit. Choose heat tolerant types for summer and cold tolerant types for winter.

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 (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>

1st Season: Fall

- Soils cool
- Worms come up from where they hid
- Days get shorter
- Plant short season, cool tolerant crops labeled “plant as soon as the soil can be worked in the spring” description on seed packets – this works for the rest of the country, not here

2nd Season: Winter/Early Spring

- Days get longer after solstice, nights shorter
- Air temperatures and soils get warmer
- Feb 14 average last frost date – unless you are higher in elevation than Phoenix (around 1100')
- Early fall plantings mature for harvest

3rd Season: Summer

- Tropical, sub-tropical, Mediterranean crops do well
- Native beans, black eye peas, lima, and yard long beans
- Melons (lots of melons), gourds, Armenian cucumbers, eggplants, okra, basil, sweet potatoes
- Some of the spring plants can make it through summer with shade

Monsoon is a Different Summer

- In addition to heat, there is humidity and rain.
- Just before monsoon, plant many of the native varieties (Native Seed/SEARCH)
- Beans, corn, short season melons, cucumbers, short season tomatoes
- Summer squash and short season pumpkins or winter squash

Finalize Your Layout and Dates

- Once you have decided what to plant, draw layouts of your garden based on seasons and sunlight
- Prepare a garden journal to keep track of history, successes, problems, etc.
- Start seeds indoors 6-8 weeks before they will go outdoors (e.g. tomatoes, peppers)

STEP 3: GROW RECOMMENDED VARIETIES

- Seasonally adapted:
 - Warm season = heat tolerant
 - Cool season = cool or cold tolerant
- Short time to maturity is best for annuals
- Pest and disease resistance
- Local seed specialists - Native Seed/SEARCH

STEP 4

SEEDS, PLANTS, EQUIPMENT, SUPPLIES

Seeds

- Check expiration date
- From a reliable source
- Can be stored in a cool dry place
- Consider doing a germination test
- Organic, heirloom, hybrids

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. Aclimete antes de transplantar.



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

Native Seed/SEARCH

TS516. **True Greek Oregano**
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

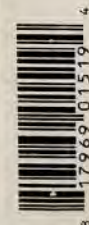
Origanum vulgare hirtum. Most herbs are easy to grow and are quite happy in poor, gravelly soils. Besides being essential to fine cuisine, herbs are used medicinally and are effective insect repellents.

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.

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

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



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.

Tools and Equipment

- Hoe, spade or shovel, spading fork, garden rake, trowels; pitchfork for composting
- Soil thermometer
- Measuring stick, planting string
- Hoses, nozzles, and watering cans
- Shade and frost cloth, supports
- Gloves, hats, sunscreen, shoes
- Wheelbarrow or garden cart

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'

Fertilizer: Guaranteed Analysis

- NPK is arithmetically described:
 - 21-3-0, 16-20-5
- Powder
- Granular
- Liquid concentrate
- Water soluble



Organic Options

Animal or vegetative based

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



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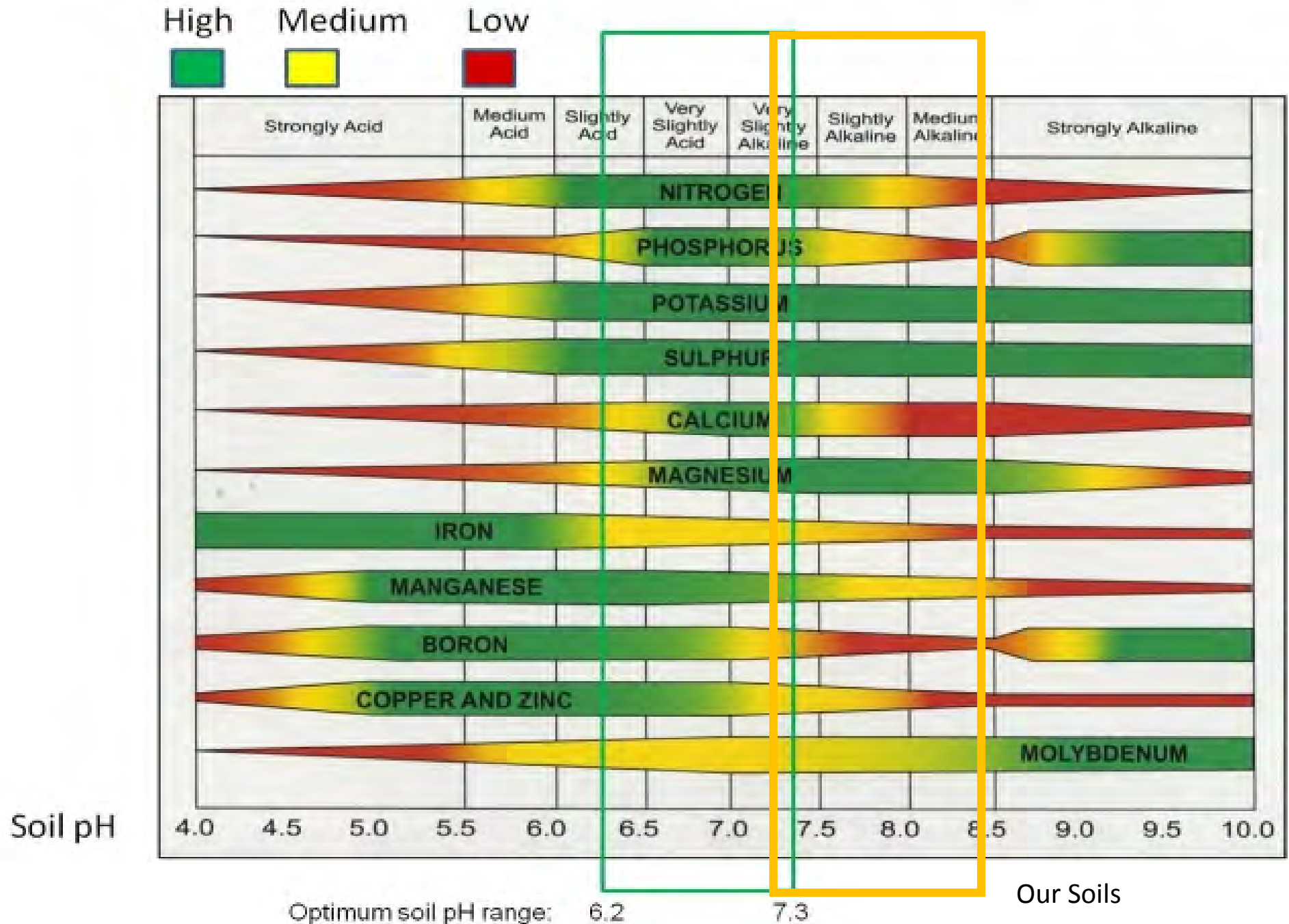
Micronutrients: 17 Elements

- Valley soils test well for most micronutrients
- If soil is lacking specific micronutrients, apply and work into soils
- Consider a soil test to determine what the soil needs, before spending money on fertilizers

Why Fertilize?

- To supplement nutrients in short supply or depleted by repeated crops
- To provide extra nutrients when plants require them
- To make nutrients more available in our alkaline soils
- To compensate for climatic conditions which inhibit nutrient absorption

How soil pH affects availability of plant nutrients



Herbicides and Pesticides

- As needed, personal choice
- Need to be fresh due to short shelf life
- Buy in smaller amounts
- Keep in a clearly labeled, sealed container
- Store under lock and key
- Read and follow ALL directions for use
- These are toxic; they mean to kill something after all!

STEP 5

SOIL PREPARATION

- Obviously, vegetables are not desert-adapted plants
- Role of soil
 - Provide water and nutrients necessary for growth
 - Provide a stable place for plants to grow

Low Desert Soils: Physical Properties, Soil Texture

- Soils consist of sand, silt and clay. They also may contain humus (organic matter) but not so much here in the desert.
- Our soils are eroded mountains, the product of eons of mineral-rich erosion

Low Desert Soils:

Physical Properties, Soil Texture

- Sandy soils drain well and promote healthy root growth, but dry out quickly. Nutrients leach out very quickly.
- Clay holds moisture and nutrients but often becomes so compacted that plants don't receive oxygen. It is also harder to wet, as water runs off.
- Loam -- the Holy Grail mixture of sand, silt and loam -- drains well, while holding nutrients and moisture.

Soil Texture

What's your soil composed of? Try the jar test

Bag of 2 cups of soil from your yard (dried and free of stones, roots, etc.)

Use a Mason jar or other see-through container with lid (quart size)

1 tsp of non-foaming liquid soap



Clay layer – water clears

Silt layer – 2 hours

Sand layers – 1 minute

*Photo: Colorado State University Extension,
Colorado Master Gardener Program*

Soil Texture

- Put the soil into the quart-size jar. Fill but leave room for shaking. Add 1 tsp of the dish soap.
- Close the lid tightly and shake the jar for about 3 minutes or until everything is mixed. Set the jar in a safe place and leave it for 2-3 days or until the particles have all settled. Do not mix again.
- Finally, measure the amount of each type, sand, silt and clay.

Soil Texture

8. Measure the heights of each individual layer in centimeters and write those down.

Height of sand layer
(bottom) _____

Height of silt layer (middle) _____

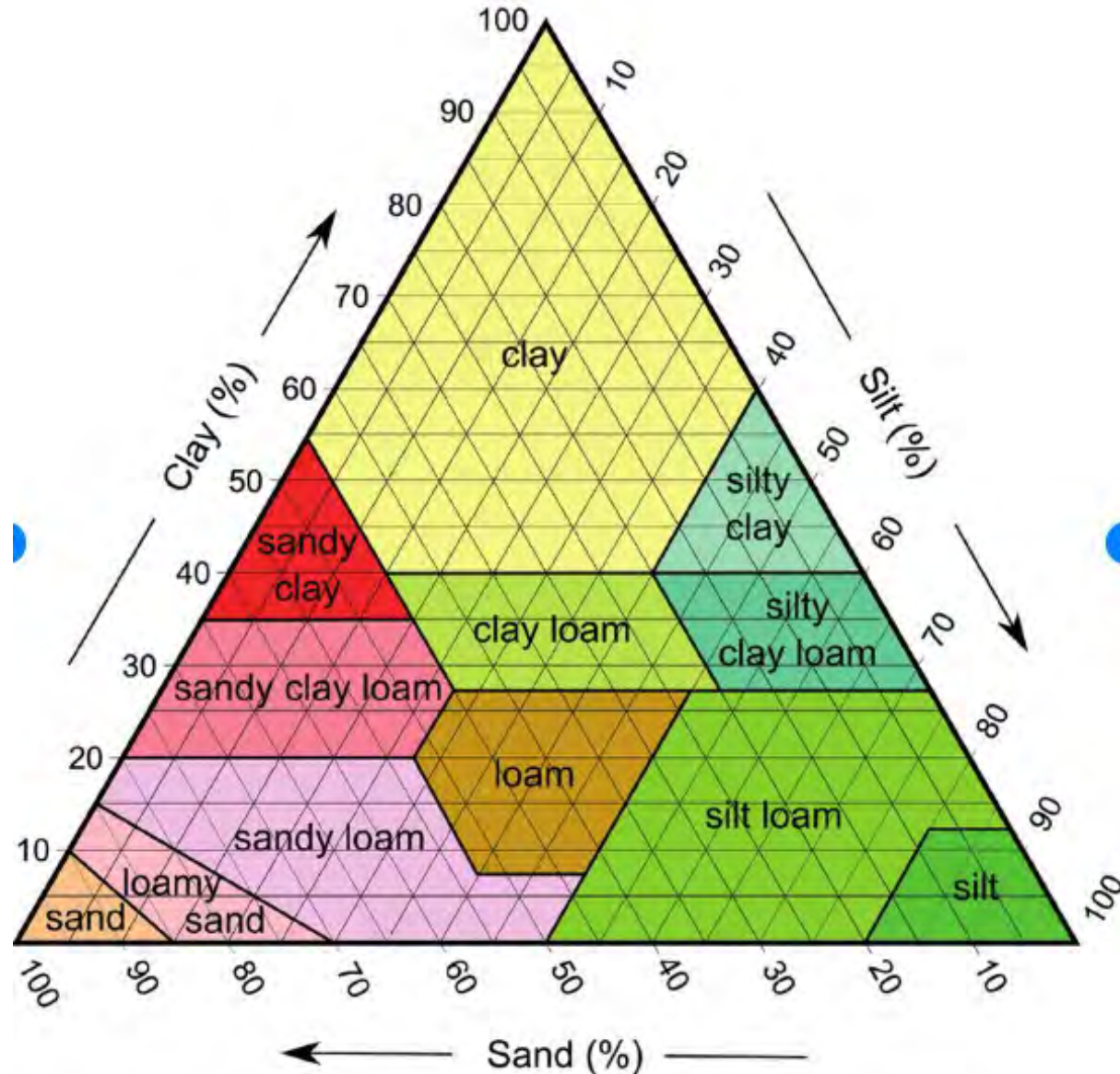
Height of clay layer (top) _____

Divide the height of each layer by the total soil height and multiply the result by 100. Write the results below.

(sand height/total height) x 100 =
_____ %

(silt height/total height) x 100 =
_____ %

(clay height/total height) x 100 =
_____ %



Soil Structure

Grouping of Soil Particles

- Protect soil structure – do not overwork soil, never any more than necessary, only when compacted (when starting garden)
- We accommodate non desert adapted plants by changing soil structure
 - With organic soil amendments, continuously
 - By cultivating when starting the bed
 - Mulching with materials that decompose

Characteristics of Desert Soil

- Alkaline
- Salts (Sodium is only one)
- Underlaid with layers of calcium carbonate: also known as "caliche"
- What's Missing?
 - Organic material
 - Living organisms

Role of Living Organisms

- Continue the decomposition process
 - Improve nutrient availability
 - Keep soil aerated
 - Are engaged in symbiotic relationships with plants.
- *New soil delivered from commercial source may not have these little helpers

Soil Preparation: A Transition 'Desert soil' to 'Garden soil'

1. Physical manipulation of soil
 - Tilling, spading, digging
2. Add “soil amendments”
 - Stuff we put into the soil
3. Compensatory measures
 - Raised beds, irrigation, mulches

Soil Amendments

- Compost
- Manures
- Minerals
- Fertilizers
- Inoculants
- Living organisms
 - Single celled
 - Worms
 - insects

Compost

- Decomposing organic materials
 - Vegetative matter
 - Anything that was once living with roots, leaves and stems; not faces
 - Can be home made or purchased



Herbivore Manures

- Digestion is a composting process
- Different animal manures have different properties and nutrient values
- Some can be applied directly to the garden
- Can be composted on it own
- Can be added to a compost pile
- Manure is ***not*** necessary for a garden or a compost pile to have success

Herbivore Manures

- Horse
 - Often contains weed seed and may be high in salt. Horses often eat Bermuda grass hay...
 - Can be added to garden or composted
- Goat, Sheep and Rabbit
 - Not super high in nitrogen
 - Can be applied directly to garden without composting

Dairy or Steer Manure



- Available in bags or at farm sources
- Urea or nitrogen content is secondary to organic components without a guaranteed analysis
- If obtained fresh from a farm, compost first

Chicken/Poultry Manure

- High in nitrogen, can burn plants if directly applied without composting
- Do not use in the same volume as other manures
- Either compost it or allow soil to rest after incorporating
- A good addition to compost high in carbon material

Green “Manure”

A crop used specifically to:

- Break up heavy soil
- Increase nitrogen in soil
- Hold Moisture
- Prevent Erosion
- Control pests / disease
- Cultivated or turned under before the crop matures and allowed to decompose

Other Amendments

- Soil sulfur - to mitigate alkalinity
- Gypsum - counteract excessive salt build-up (Publication AZ1413)
- Inoculants for legumes
- Coconut coir

Do Not Use As Soil Amendments

- Peat moss
 - no nutrients
 - hard to re-wet
 - not sustainable
- Lime
 - A common east coast component
NEVER recommended for desert soils
- Wood or BBQ ashes. Highly alkaline!

Do Not Use As Soil Amendments

- Sand
 - Some sources suggest sand to improve drainage, but adding sand to clay can result in adobe or compaction
 - Alternative is pumice - a volcanic rock that helps change physical soil structure

Initial Garden Preparation

- Add 3-6 inches of organic materials to native soil
- Add fertilizer as needed, per package instructions
- Add other minerals as needed
- Dig the garden to the depth of 16 inches to integrate all this
- Rake level, remove debris, irrigate, and plant

STEP 6

PLANT VEGETABLES PROPERLY

- Seeds
 - Greater choice of varieties
 - Ease in successive plantings
 - Seeds are *magic*
 - Costs are different
 - Follow package instructions for spacing

Seeds

- Irrigating sufficient to germinate and maintain young seedlings. Seedlings need less water – but more frequently – than grown plants
- Protecting young seedlings from predation
- Having to decide among all those choices
- Storing seed: cool dry place in airtight containers

Seed Planting

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

Transplants

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

Downsides 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

Upside 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"

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

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 one place multiple seasons greatly increases the possibility of disease, such as Verticillium Wilt or Fusarium
- Beans/legumes fix nitrogen in the soil, helping future crops.

STEP 7

IRRIGATION

“Gardening in the west is easy. All you have to do is make the soil, and make the water.”

Eleanor Welshom

Irrigation Information

- Books
- Arizona Municipal Water Users Association
 - Smartscape
- City water departments
- Cooperative Extension
 - Inspect several options in garden
- Desert Botanical Garden

Irrigation

- Drip, soaker hose or drip tape on a timer
 - Convenient and easy
- Spigot and a hose
 - use to water transplants, seedlings, special needs plants
 - washing insect pests
 - mixing liquid fertilizers
 - washing veggies, hands, tools, etc.

Irrigation: How Often

- 1 gal. of water wets 1 cubic foot of soil
- Vegetable plants need higher soil saturation than desert adapted plants
- Plants use more water on long, hot, dry and/or, windy days
- Mature, bearing plants use more water than seedlings, but seeds and seedlings need more frequent water (to stay moist)

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

Container Gardens and Raised Beds

- Container gardens and raised beds have different needs than ground level gardens
- Soil type impacts the rate of water applied and the frequency of applications.
 - Sandy and gravely water drains quickly
 - Clay holds water

STEP 8

MULCHING

- A mulch is something that is used to cover the soil between plants or rows
- Organic or inorganic
- Permanent, temporary
- Can be rock, carpet, compost, hay, straw, chips, newspaper, commercial compost and so on

Mulches in Summer

- Moderate the soil temperatures
- Help prevent evaporation
- Help to prevent a crust from forming on the soil surface
- Keep many weeds from germinating
- Can protect tender crops from insects, pests and rot.

Mulches in Winter

- Can slow soil warming as spring progresses
- Can hold heat in the soil on cold night when frost is expected
- May provided home for unwanted insect pests
- Prevent weeds from germinating

Which Mulch, Where?

- Use compost where you will want to dig it in after harvesting a crop
- Other organic materials such as wood chips will break down and add to soil nutrients
- Use straw/pine needles to protect melons and tomatoes from soil contact
- Use a more permanent type for paths chipper chips, rock, carpet...

Weeds

- Compete for water and nutrients
- Can shade less aggressive, valued plants
- Host insect pests
- **Remove them small before they flower and make seed!**
- Are a rich nitrogen source when added to a compost pile, before they seed

Weed Control

- Use least toxic methods first!
- Identify the plant
- Mulch: weed seed needs light to germinate
- Mechanical removal—pulling or hoeing young and tender
- applications of herbicides
- not all pesticides work on all plants
- pre emergent vs. post emergent

STEP 9

BE PREPARED FOR 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.
- Plants can withstand some predation and still produce well

2- or 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



STEP 10:

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