

Plant Propagation and Pruning



Laura Ward
Arizona Master Gardener
Contact: lajward@gmail.com

County-specific and local. Each county extension office has their own program. Maricopa and Pinal Counties focus on our conditions in the low desert.

A University of Arizona trained gardener 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.

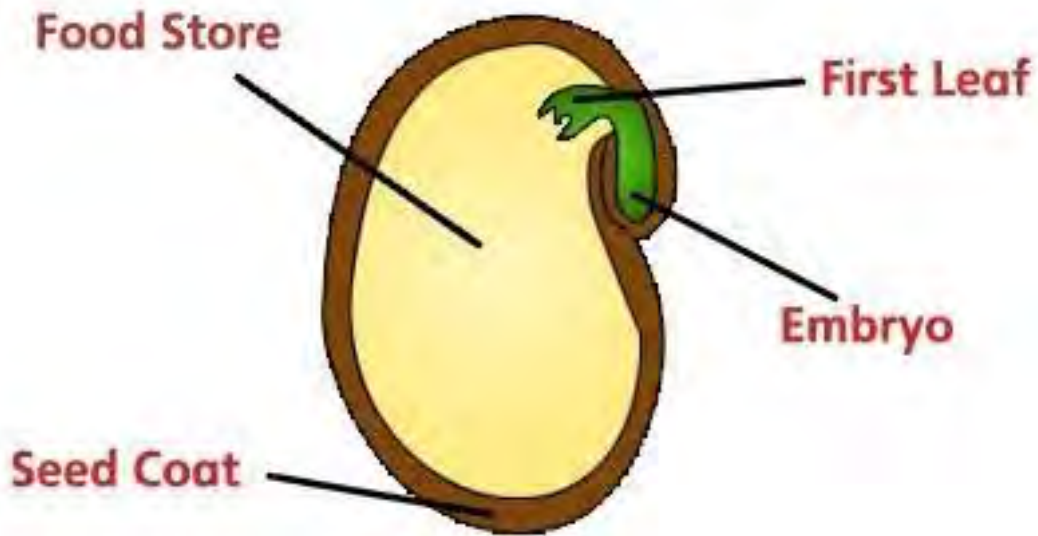
What is an Arizona Master Gardener?

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.

Seed Basics

Parts Of Seed



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Most seeds are composed of three major parts: embryo, endosperm (food storage) tissue, and a seed coat (protective tissue).

The embryo is a miniature plant in a resting (dormant) state.

Most seeds contain a built-in food supply called the endosperm.

The seed coat protects seeds from injury and from diseases and insects. The seed coat usually prevents water from entering the seed until time to germinate. The seed coat in many cases allows seeds to be stored for extended periods.

Obtaining Seed

- To obtain vigorous plants from seeds, start with high-quality seeds from a reliable source.
- Select cultivars that provide the desired size, color, and growth habit. Choose heat tolerant types for summer and cold tolerant types for winter.
- 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 seed packet label ~~usually~~ sometimes has information about the cultivar, the year the seeds were packaged, instructions for planting in our area, the germination percentage, and days to germination.

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. Aclimate antes de transplantar.



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

PACKED FOR 18 SELL BY 12/18 R1

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

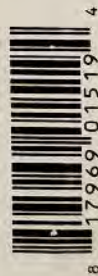
Origanum vulgare hirtum. Most herbs are easy to grow and are quite happy in poor, gravelly soils. Besides being essential to fine cuisine, herbs are used medicinally and are effective insect repellents.

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

Storing Seed

- Store seeds them in a cool, dry place.
- If you have saved your own seed, ensure it is well dried. Then package with the date, type, and other information you will find useful later.
- Laminated or foil packages help ensure dry storage.
- Paper packets are best kept in tightly sealed containers and maintained around 40°F in low humidity. A good storage location would be an airtight jar in the refrigerator.
- Longevity of seed in storage is dependent on storage conditions, the initial quality of the seed, and the seed species. In general, large seeds can be stored longer for longer periods of time than small seeds.

Pollination Considerations

- Open-pollinated plants can cross-pollinate, which increases biodiversity, but plants that sprout from the seeds may display different characteristics than the parent plants. This can be interesting, it may produce less than desirable results.
- If you desire an exact replica of the parent plant, use either a closed environment (such as a greenhouse) or propagate the plant by cuttings, also called cloning.



Pollination Methods

Open-Pollinated or Cross-Pollinating:

Self-pollinating (self-fruitful) vegetables:

- Tomatoes
- Beans
- Bell and chili peppers*
- Eggplants
- Green beans
- Lettuces, endive
- Lima beans
- Peas

Wind-pollinated vegetables:

- Corn
- All members of the Chenopodiaceae family, including:
 - Beets
 - Spinach*
 - Swiss chard

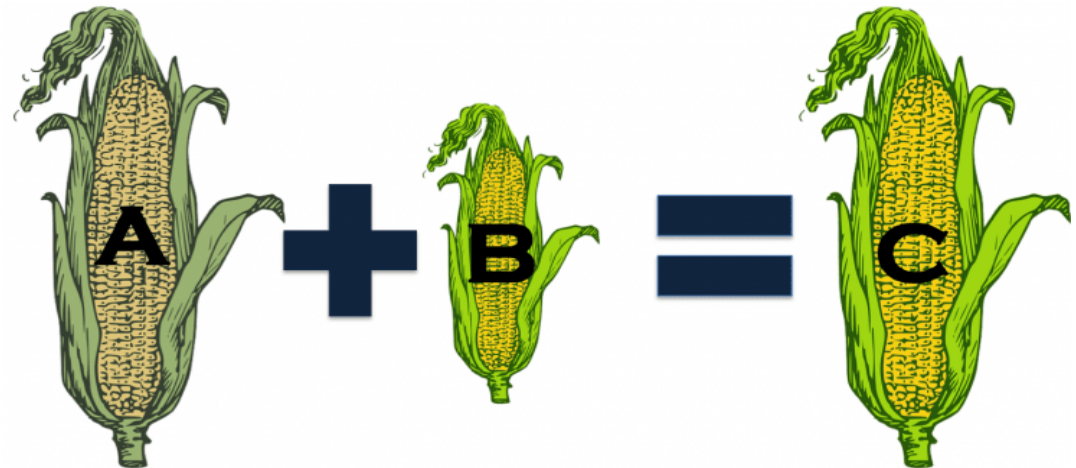
Insect-pollinated vegetables:

- Asparagus
- Broccoli
- Brussels sprouts
- Cabbage
- Carrots
- Cauliflower
- Celery
- Collards
- Cucumbers
- Eggplant
- Kale
- Melons
- Squash
- Mustards
- Onions
- Bell Pepper*
- Chili Pepper*
- Radish
- Spinach*
- Turnips

*Some vegetables are pollinated by multiple methods!

Hybrids

- Hybrids result from natural cross-pollination or can be human-made varieties
- Many varieties sold today are intentional hybrids, bred for particular characteristics. These hybrids are typically uniform and vigorous.
- Most hybrids are not true-breeding: seed from the hybrid will produce plants displaying traits covering the full genetic range of the two parents. This can be useful if you are interested in experimenting. Plant breeders often create a range of characteristics in a population by crossing two parent lines and selecting ideal types from the subsequent generations.



Hybrid vs. GMO

- Hybrids result from natural or human-assisted cross-pollination
- A Genetically Modified Organism (GMO) is an organism whose genetic structure has been altered by adding a gene that will express a desirable trait.
 - This is often referred to as ‘gene splicing’. This new trait might improve a crop or organism’s nutritional qualities, make a crop resistant to herbicides, or protect a crop from pests and disease.
- The overall goal of the GMO is to make the crop more desirable for the producers and/or consumers of the end product.
- Neither will “breed true” – to obtain a replica, the parent must be cloned

Seed Saving – Dry Pod Types

- Allow the seed structures to remain on the plant until the seed pod or head begins to dry and turn brown, then collect.
- Plants like lettuce that produce many flowers on a seed stalks should be harvested before the seeds fully mature and the white “feathers” developed.
- Cut each flower stalk below the lowest flower and place into a paper bag head first. Store with top open in a warm, dry area with good air circulation for one to two weeks, or until the seed pods or seed heads are completely dry and starting to shatter (shed seed).
- Seeds can be thrashed from the pods or seed heads by breaking open the seed pods or rubbing the seed heads between your palms (wear gloves).

Seed Saving – Fleshy Types

- Fleshy types include tomato, melons, cucumbers, squash, and pumpkins
- Saving these seeds will benefit from a “fermenting” process.
- Select clean, disease-free, fully ripe fruits as seed sources.
- Cut the fruit open using a clean knife and scoop or squeeze the seeds into a clean container.
- Add water to the container and keep the container at room temperature, allowing the mixture to ferment for several days. Stir daily to help separate seed from the pulp.



Seed Saving – Fleshy Types

- After several days the mixture should be good and frothy.
- Any ‘floaters’ are nonviable, or at best will produce weak seedlings. Strong, viable seeds will sink to the bottom of the container.
- Pour off the pulp and floaters, leaving the good seeds in the bottom of the container. Repeat this process several times, adding fresh water each time and allowing the seeds to settle before pouring off the water.
- When the water is clear, the seeds are ready to be dried

Seed Saving – Fleshy Types

- Dry the seeds in a place with warm air and circulation.
- Dry seed as quickly as possible, but the temperature must not go over 96°F. Do not dry in direct sun. The top of a refrigerator is warm and has a lot of air circulation. Caution: seeds can stick to paper towels and cloth.
- Pepper seed, although harvested from a fruit, does not require fermentation.
- Harvest pepper seed from mature colored peppers, such as red or yellow, not from immature green fruit. Cut open the fruits and scrape the seed onto a paper towel or plate to dry.

Planting: Stratifying and Scarifying

- Not all seed will grow simply because it is placed in soil and watered; some seeds needs to be “convinced” the conditions are right.
- Stratification is a means of simulating the chilling and warming that seeds would endure if left outdoors in their native climate for the winter.
- Scarification means scratching or cracking the hard outer coat of a seed to help it germinate. Some seeds have outer shells that are extremely hard and don’t allow water through. This is one way a seed stays dormant in the fall and winter until growing conditions improve.

Stratifying

- In the wild, seed dormancy is usually overcome by the seed spending time in the ground through a winter period and having its hard seed coat softened up by frost and weathering.
- The seed is undergoing a natural form of "cold stratification" or pretreatment. This cold moist period triggers the seed's embryo; its growth and subsequent expansion eventually break through the softened seed coat in its search for sun and nutrients.
- Candidates for stratifying include grapes, parsley, several types of herbs, flowers and trees.

Scarifying

- In mechanical scarification, the seed coat is opened to allow moisture and air in. Seed coats may be filed with a metal file, rubbed with sandpaper, nicked with a knife or a small clipper, or weakened or opened in another way.
- In nature this typically happens through repeated warming, cooling, dampening and drying during fall and winter. Animals and birds also scarify seeds by eating them.
- Some seeds, like morning glories, lotus, and our desert-adapted legumes (Mesquite, Palo Verde, Cascalote, Ironwood, etc) must be scarified as they have outer shells that are extremely hard and don't allow water through.

Propagating Seedlings

- Due to our varied growing seasons, many plants benefit from being started indoors. Plants such as tomatoes and peppers can be started from seed two months prior to the last frost date (mid to late Feb)
- If using an outdoor greenhouse, insure the soil is getting warm. Lights or heat mats will help.
- Harden off seedlings by taking them outside during the day and inside at night. Increase the time they spend outside each day until you plant them in their permanent outdoor space.

Propagating Plants from Cuttings

- Propagating a plant from a cutting results in a clone of the parent.
- Simple terms are used to describe where the cutting originated from (e.g., root, stem, leaf), or with stem cuttings, the relative age of the wood/tissue (e.g., softwood, semi-hardwood, hardwood)
- After taking a cutting, mark which end is “up” and which is “down”

Propagating from Cuttings – The Medium

- The media you use to root cuttings can have a significant impact on your rooting results
- An ideal rooting media needs to be sterile, well drained and provide adequate oxygen.
- Individual components that are most commonly used include coarse perlite, coarse vermiculite, peat moss and sand/pumice. These individual components can be combined in a variety of ways.

Propagating from Cuttings – The Medium

- You can sterilize potting medium in the oven. Bake at 200 degrees for 30 minutes. Or in the microwave, Heat the soil for about 90 seconds per every couple pounds on full power. If possible, use a thermometer to ensure the internal temp reaches 180 degrees.
- Place your growing container in a location that will avoid most light and high temperatures.
- The cuttings will be working on establishing new roots, not photosynthesizing light for food. They can rely on stored food until new roots are generated

Propagating Plants from Cuttings

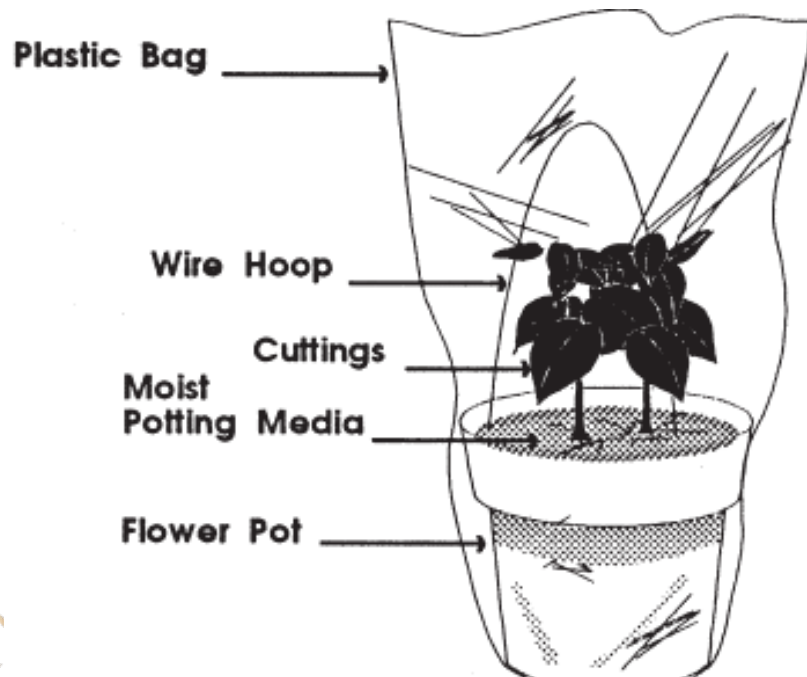
- It is critical to maintain the highest level of relative humidity possible around leaves until roots form.
- Commercial propagators use intermittent mist systems For humidity. Misting with a spray bottle is a simple method for the gardener.
- The goal is to trap moisture already present in your rooting media.



Figure 3. Typical three-node semi-hardwood cutting with basal leaves removed.



Figure 4. Effect of media on rooting performance. Left: vermiculite, peat moss, perlite, peat:perlite





Pruning



Pruning Shrubs in the Low and Mid-Elevation Deserts in Arizona

Ursula K. Schuch

Pruning is the intentional removal of parts of a plant. Pruning needs of shrubs commonly planted in the low and mid-elevation deserts in Arizona vary from no pruning to regular seasonal pruning. Requirements vary by plant species, design intent, and placement in a landscape. Fast growing shrubs generally need frequent pruning from the time of establishment until maturity, while slow growing shrubs require little to none. Pruning should only be done when necessary and at the right time of year. Using the natural growth form of a shrub is a good guide for pruning. Shearing shrubs should be avoided except for maintenance of formal hedges or plant sculptures. All pruning should be done with sharp hand pruners or, for thicker stems, loppers.

visibility and safety concerns is sometimes necessary. These can be minimized by allowing sufficient space for the plant to reach its mature size in the landscape. Renovating or rejuvenating old or overgrown shrubs through pruning generally improves the structure and quality of the plant, and results in improved displays for flowering shrubs. Some shrubs are grown as formal hedges and require continuous pruning to maintain their size and shape.

How to prune?

Selective thinning refers to removing branches back to the point of attachment to another branch, or to the ground. This



Pruning

- Never prune just to prune. Only prune for a reason.
- Pruning always causes a wound and always results in some response: loss of foliage and ability to create food from sunlight, potential entry points for decay organisms, an increase in sprouting, reduced or increased vigor and susceptibility to insect problems.
- Decide whether the desired benefit will override the negative effect on the tree.

Pruning

Valid reasons to prune:

1. Dead, dying or diseased material;
2. Crowded or crisscrossing branches/limbs, or to establish a dominant leader;
3. Safety, Interference or clearance;
4. Reduce growth;
5. Size and shape.
6. To allow in light if the tree has heavy foliage and there is no fruit production at the interior

Pruning Shrubs

Selective thinning refers to removing branches back to the point of attachment to another branch, or to the ground. This type of pruning opens the plant canopy, increasing light and air movement

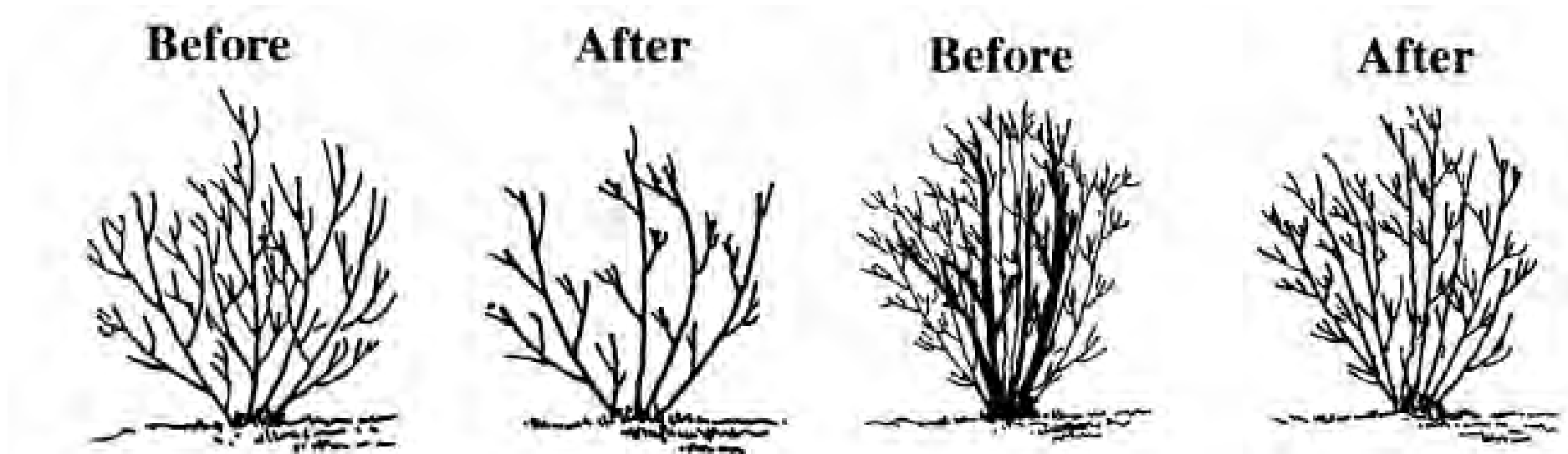


Figure 1. Selective thinning removes the branches back to the point of attachment (left) or to the base of the plant (right) and preserves the natural shape of the plant.

Pruning Shrubs

Avoid the upside down triangle!

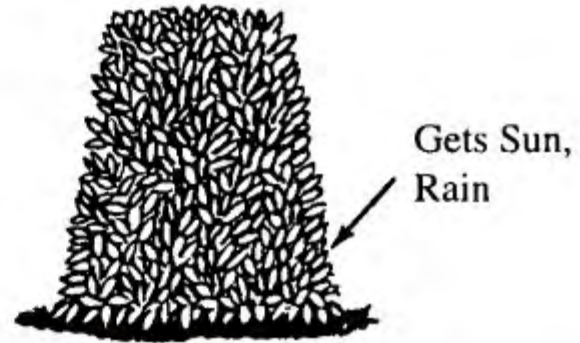
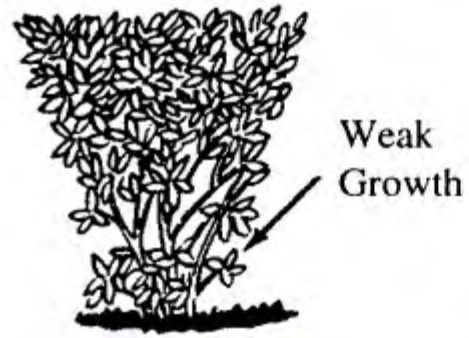


Figure 8. The top of hedges should not be wider than the bottom, which will result in defoliation (left).

Pruning – Restorative Pruning of Shrubs

Restorative or rejuvenating older or overly large shrubs extends their life and improves their aesthetic value. Cut all stems about 12-18 inches above the ground. This is a severe and changes the appearance drastically. However, when done in spring before bud burst, a great proliferation of stems will grow just below each cut by mid-summer.



Figure 3. Rejuvenating shrubs that are overgrown starts by cutting them at 12-18 inches above the ground in late winter or early spring. By fall the shrub has grown a full new canopy



Pruning – Frost Damage

- Frost-damaged plants such as bougainvillea and yellow trumpet flower should be cut back to living wood after all danger of frost has passed or when regrowth resumes.
- Red bird of paradise is generally cut back to six to ten inches above the ground. Lantana is cut back to just above the ground after frost danger has passed.

Pruning – When to Prune

- Prune after flowering shrubs have completed flowering.
- Spring flowering shrubs like cassia or rosemary should be pruned in late spring.
- Summer or fall flowering shrubs like oleander, dalea, or Texas ranger should be pruned after flowering or in late winter to early spring. Spring flowering plants complete flower bud formation the previous year, therefore pruning in early spring will remove the current season's flowers.

Pruning – When to Prune

- Summer and fall flowering shrubs usually generate flowers on the current season's new growth. They should be pruned either after flowering or before new growth resumes in spring.
- Selective pruning of a few branches can be done on most plants throughout the year. Some very vigorous growing shrubs like bougainvillea or firethorn need light pruning throughout the growing season, unless they are given ample space to grow naturally.

Pruning – Shearing

- Shearing shrubs entails cutting back branches to a uniform surface. This should not be done other than for formal hedges or special topiaries.
- Shearing is labor intensive and requires repeat shearing to maintain the shape.
- It destroys the natural growth habit and gives shrubs an unnatural look. It is difficult to control the plant height since the new dense growth shades the inside of the canopy which can defoliate for lack of light.

Pruning – Shearing

- Subsequent cuts into the new growth will shear close to the surface, but over time the dimensions of the canopy will increase.
- Cutting into the older, bare wood by shearing results in a leafless shrub, limits the plants ability to produce their own food, and depletes their reserves to grow new leaves. This stresses the plant and can result in decline or death. Regular shearing of shrubs removes flower buds, flowers, and destroys their natural form.





What about Hedges?

Use a plant variety that tolerates repeated shearing, such as privets and xylosma



Figure 6. Japanese or waxleaf privet (left) and xylosma (right) tolerate shearing and are appropriate for formal hedges.

Pruning – Removing a Co-Dominant Leader

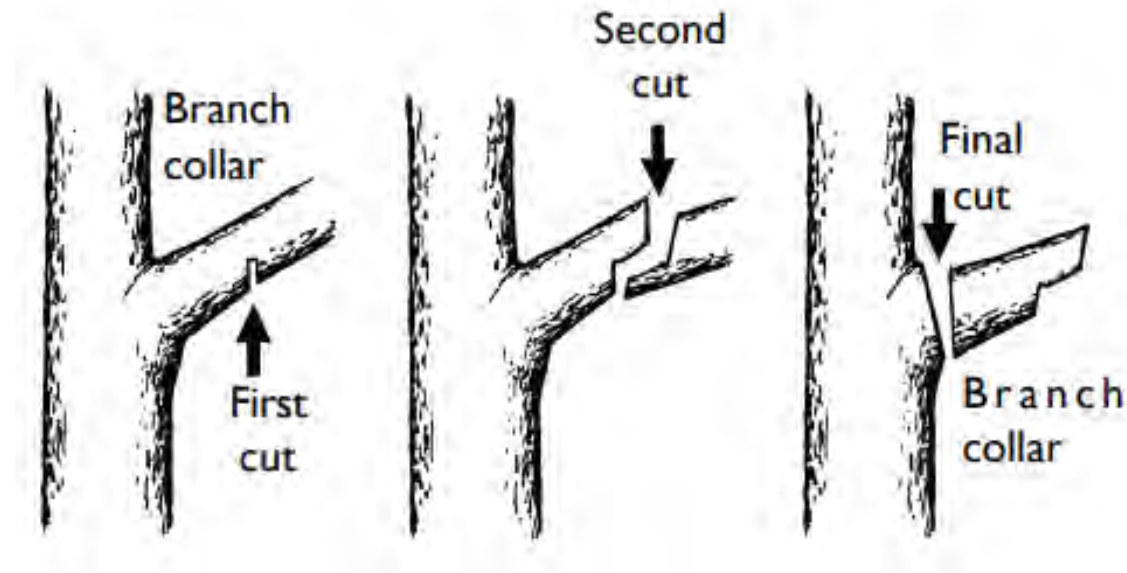


Pruning – General

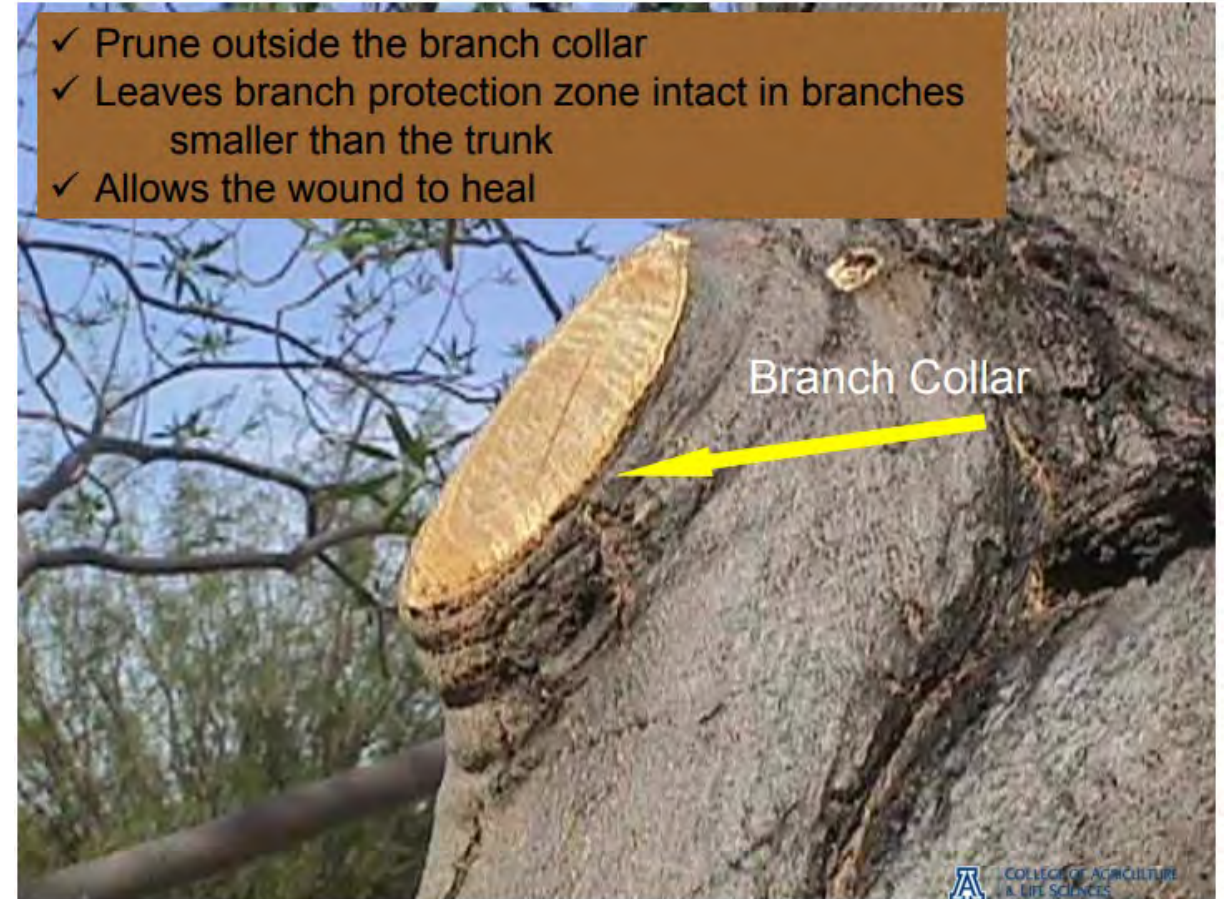
- Never remove more than 20% of the foliage unless restorative pruning.
- Cut above a bud, which prevents unsightly stubs that die back
- Leave the cut to heal naturally; do not apply paint to the cut surface
- On trees, cut outside the branch collar and do not leave stubs

Pruning: 3-Cut Method

Use three cuts to remove larger limbs.
This prevents the bark stripping down
the trunk

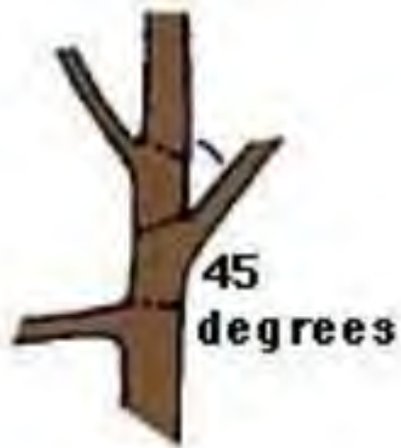


Pruning – Outside the Branch Collar



Pruning – Branch Angles and Size

- 45 to 60 degrees is a good angle
- The branch you cut back to should have a diameter of at least half that of the branch to be removed



Wrong Plant / Wrong Place

- If the plant continuously grows too large for its space, it is the wrong plant for that space.
- Replace the plant with a more appropriately sized plant to allow natural growth and flowering

Tree Pruning: Water Sprouts & Suckers

- Prune to remove suckers that grow from the base and water sprouts that shoot up from older limbs. They grow from latent buds.
- Water sprouts are not as strong as natural tree growth and produce very little fruit, usually of poor quality.
- Suckers that come up from below the graft may produce fruit but it will likely be inedible.



References

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- <https://extension.umaine.edu/publications/2750e/>
- <https://www.uaex.edu/publications/PDF/FSA-6024.pdf>
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