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HAVE YOU THOUGHT ABOUT PLANTING A FRAGRANCE GARDEN?

Some plants give off a sweet aroma while others produce a smell that may not be so attractive, but many people enjoy plant fragrances so much that they create whole gardens around them.

Many plants have a fragrance of one type or another. Some of these plants are annuals, meaning that they must be replaced each season. Others are perennials and live for many years. A careful garden design mixing the two types together can make an attractive and interesting garden that is pleasing to the nose as well as the eye.

Some fragrances are produced by flowers, while other scents may come from the fruit, or the leaves, or the sap of a plant. If you have ever enjoyed the fragrance of a sweet flower, smelled the pungent odor of juniper berries, noticed the bitter smell of a broken stem of climbing milkweed, or experienced the enjoyable odor after touching a stem of rosemary, you will know what I mean. A collection of plants that produce fragrances from multiple sources can increase interest in the garden. Indeed, many fragrance gardens will display a variety of aromas that come not just from flowers, but from other plant parts as well.

Not all plant odors are pleasant smelling to say the least, but that can be part of the fun, especially if you are into studying, or just enjoying, a diversity of plants. If you like variety, don't let yourself get locked into just those that have a nice smell. You could be missing out on a multitude of different experiences.

As an extreme example, take the arum plants. They produce a flower structure that gives off a rotting flesh smell. Now, most would say that the odor is definitely not pleasant, except..., except there are certain insects that are drawn to such an odor seeking a place to lay their eggs. In the end, there is no rotting flesh for the young insects to feed on, but the adult insects in their crawling around end up being duped into pollinating the flower. If you are into watching insects, you might want to create a garden that includes a few plants from the "carrion flower" group to see these insects at work. Okay, for obvious reasons you may not want to plant them up close to the house. I get that.

While I am encouraging you to consider a diverse type of garden, I must say that one must be careful in making choices on what to plant. Fragrances, both pleasant and repulsive, can play a role in the quality of life for many people. You can probably imagine those roles as well as I.

For some people, fragrances can call up memories of past experiences. Odors that are attached to good memories usually help us recall fondly something wonderful from the past. For others, a particular odor can bring to mind an

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experience that may not be so pleasant. Planning a fragrance garden may need to take past experiences of others into account.

Still, in general, the good that can come from plant fragrances for most will far outweigh the possibility for the bad. Plant fragrances can help provide relief in the midst of moments of stress, grief, or painful memories; or they can help us feel positive emotions like love, compassion, and empathy. Sometimes reflective moments come out of the blue sky after a single whiff of a long forgotten smell.

There is the question of preference, of course. Some may enjoy the fresh pungency of spearmint while others may detest it. The heavy, sweet smell of the sweet acacia is a sure sign of approaching spring in desert communities, but not everyone enjoys the odor.

Then, there are the health concerns. If one has allergies, no matter how enjoyable the smell of citrus blossoms in the spring might otherwise be, there may come a time when the only wish is for all citrus trees to be pruned at ground level with a chainsaw! It pays to think ahead when planning a fragrance garden.

There is a lot of commercial interest in plant fragrances, for sure. The perfume and cologne business has a heavy interest, as does aromatherapy, another industry that seems to be gaining the interest of people. I doubt most of us will ever go into the fragrance business, but some of you might. If you are interested, you might take a look around and learn more about the aroma industry.

You might be wondering why plants produce fragrances in the first place? In most cases, the purpose for a fragrance is to either attract something to help it, or repel something that might do it damage. More often than not the purpose is to draw pollinators to the flowers to help create viable seeds. In some cases, the odor chases away insects or other animals that would like to otherwise make a meal out of the plant. Part of the fun in working with plants is to try to figure out the answers to questions like these. I encourage you to enjoy the fragrances, yes, but also try to answer the "why" questions also. It can be fun.

If you decide to create a fragrance garden, a careful evaluation of the many different possible plants is a good place to start. In addition to those already mentioned, there are lots of others that produce fragrances that do well in desert gardens. If you are into roses, take time to test the smells of the many different named varieties. I like the fragrance of 'Mr. Lincoln' because it is not overpowering, but others like the vivid aromas of 'Dolly Parton' and 'Perfume Fragrance.' Yes, there are roses with those names. For a climbing rose, try 'Iceburg.'

For shrubs, I like lavender, pittosporum, Texas mountain laurel, honeysuckle, and viburnum. Some people can grow gardenia in the regular soil but most find it best to place them into a container where the soil pH can be controlled.

The purple floss flower has a nice smell to it, as does the moonflower. Most would consider the fragrance of a paper white as acrid, yet many still like to plant them. Sweet alyssum has, well, a sweet fragrance, and is easy to grow. There are many, many others.

Plant fragrances provide an opportunity to make good memories that stay with us for life. One way to learn more about fragrances, and how to enjoy them, is to design and create a fragrance garden.

Rotate Plants in the Garden

I have a question for those of you who grow a vegetable garden in your yard each year.

Do you plant the same vegetable, like tomatoes, each year in the same spot, or do you rotate them to a different location? If you are not rotating, you may want to consider doing so this next season. It is called crop rotation and it has been a recommended practice since the dawn of time.

Over the centuries, there have been several different rotation systems used by farmers around the world. The least complicated, but also the most harmful to plant health long-term is the system of monoculture. A monoculture, or monocropping as it is sometimes called, is where the same crop plant is grown year after year in the same place. Farmers around the world try not to do that because of the negative effects it can have on soil conditions and because it tends to increase the number of harmful pests. In early America, it was common to farm a given location for years until the soil "wore out" and then pack up and move further west to start again. Today, we try not to wear out the soil.

Over time, there were several rotational systems that were tried, modified, or consistently used. Thousands of years ago, in the Mesopotamia Valley where the earliest records were kept, farmers would grow crops one year in a field and then leave the same field next year fallow, without crops, to let the soil rest. About 800 A.D., European farmers began using a three-field crop rotation by dividing the area into thirds. One year they would plant a legume plant, like lentils, that would add nitrogen back into the soil. The next year they would plant a cereal grain like rye or wheat that would benefit from the extra nitrogen. Then, the third year, they would leave the soil fallow, allow the weeds to grow, and turn in their livestock to pasture on the weeds. Not only were they able to grow more livestock, but the extra organic matter from the droppings helped the soil big time.

There were other systems used, of course. If you are interested, we can talk later, but the point is that even we gardeners should be rotating for much the same reasons. We could pick any garden plant as an example, but let's stay with the always popular tomato mentioned above.

If I grow tomatoes, and even worse, the same variety of tomato, in the same spot in my garden each year, eventually I could start seeing problems arise. For one, I could begin to see an increase of symptoms related to a shortage of a given nutrient. Yes, I know. You are diligent in fertilizing each year; you may even be adding compost on a regular basis. It may not be enough.

A standard fertilizer will generally have three nutrients added: nitrogen, phosphorus, and potassium. Sometimes iron is added as a fourth component. However, there are sixteen essential nutrients that are necessary. Where do they come from? They come from the soil itself. If a plant uses magnesium in relatively large amounts, the plant could conceivably remove more of this nutrient than the soil releases if grown in the same place each year. By rotating to another type of plant that may not need as much magnesium, I can improve the productivity of the soil.

Another problem with growing the same type of plant in the same place in the garden year after year can be the slow build up of harmful insects and diseases. Perhaps a real-life example from Arizona agriculture might help to see how this can be so.

In the early 1980's, a few cotton growers, with the permission of the Arizona Department of Agriculture, tried "stub cotton" on a large scale. My farmer friends who went through the experience would generally say that the experiment was a disaster. To understand the problem, we must understand the biology.

The cotton plant is a perennial plant, one that can live for many years. In our fields, however, we treat it as an annual plant by plowing it up and then replanting from seed each year. Stub cotton is a practice that simply uses the roots of the previous crop to grow a new plant the next year. It is simple enough to do. Instead of plowing, the farmer just cuts the stalks of the cotton plant after harvest and lets them grow again the next year. An obvious benefit is that the practices saves on the cost of expensive seed.

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In this example, there are three villain insect pests. We need to understand their biology also. These particularly troublesome insects were the caterpillars of the cotton bollworm, the tobacco budworm, and the pink bollworm. The caterpillar stages of these moths find cotton a tasty salad bar.

Even in normal years, these three insects had to be controlled at that time with multiple applications of insecticides throughout the growing season to protect the plants and the developing cotton fruit from damage. It had to be done if the farmer wanted to make any money at all. To do so, they would set aside funds in the growing budget to pay for three, four, or more applications each year. The year of stub cotton, the spray bill was double for many growers and others had to spray more than that to get anything worth harvesting. There was not much money made that year, and everyone later agreed that stub cotton was a bad idea.

What happened? The resting stage of these insects, the pupal stage, overwintered in the soil. Normal plowing and disking, both common winter practices between crops, did not occur during the winter before the stub cotton season and subsequently many of the resting insects were not destroyed by the tillage. The result was that a veritable air force of adult moths attacked the stub cotton and the subsequent infestation and damage was devastating.

"I'm not growing cotton in my garden, Rick," you say. Okay, but remember that tomatoes are very similar to cotton, and even share some of the same insect pests. The principle is the same. If you want to avoid problems in the garden, rotate the placement of garden plants from year to year and till the soil. That is the lesson of stub cotton.

It is not just tomatoes and just insects. There are many types of vegetables and flowers that we place in our gardens and each of them have their own array of insect, disease, and nutritional problems. Crop rotation is one solution.

Crop rotation in the garden doesn't have to be complicated or fancy. In its simplest form, we just remember to avoid placing our garden plants in the same spot year after year. Move them around. I do recommend that we keep some form of written record, such as a garden journal, to remind us what we did when. It can be a bound diary or a loose-leaf notebook. Draw an outline of the garden, date it, and then divide up the rows or the sections to be planted. Compare the plan with entries from previous years. It is simple and easy. Other garden activities through the season can also be added to make it a complete record.

By rotating the position of garden plants each year, it is possible to improve the overall health of our garden plants. To do it right, one needs to have a good plan, a commitment to stick to the plan, and the urgency to get it done each year.

Helping Landscape Trees Survive in the Desert

It is a sad fact of life but not every tree that is placed into the ground will survive to maturity.

For non-native trees, the desert can be a harsh environment. Many trees, perhaps too many, cannot make the necessary adjustments to survive the challenges of our native desert soils and the rigors of our hot summers. They often end up dead. The transition from container to landscape can be made especially difficult if the new tree owner does not do the job right.

When placing new trees into the landscape it is important to prepare the hole correctly, ensure that it is irrigated with water in the right way, and give the tree the best possible care throughout its life.

There are many possible reasons for tree failure and death, of course. We cannot here list all of those possibilities, but proper installation and care are prime culprits for the death of trees in our area. Let me explain.

To succeed in place, any plant must be able to feed itself from the energy of the sun through photosynthesis. A primary obstacle is the loss of leaves beyond that which the plant can tolerate. If there are insufficient leaves to generate at least as much energy as the plant needs to grow and develop, it will eventually go into a deficit and starve to death. Poor planting and poor management are key reasons for leaf loss.

To succeed in place, any plant must be able to keep itself hydrated, just like you and I need to stay hydrated with water when the desert sun blasts away. We at least can move into the shade or into an air conditioned building to cool off. Obviously, a plant cannot do that. It has to remain in its place and deal with the heat. This requires water from the roots. If the water supply fails, for one reason or another, death cannot be not far away.

To succeed in place, there must be good nutrition, good plant health, proper amounts of light, and so forth. If any one factor is limiting, it will be most likely that limitation that ultimately affects the health of any given plant.

To avoid unfortunate obstacles to plant health, it is important to "do it right" from the very beginning. By saying the "very beginning," we mean that the first step in helping trees survive in the desert is to select the correct plant in the first place.

When selecting plants, it is important to look for vigorous plants, that is, plants that appear to be actively growing and have good leaf color. A plant that seems to be stagnant with yellowish leaves is giving an indication that the root system might be either underdeveloped with a root system that is too small to support the top of the plant, or overdeveloped with a large root system that is tightly packed or constricted within the container. Neither of these conditions are good and either one could limit the success of the plant in its new home. Vigorous, green leaves are a sign of a "happy plant" that should do well after planting.

Once the plant is selected and brought home, it is time to place it in the ground. The question is, "Where?"

Site selection is a very important part of the puzzle. One of the key indicators of a good site is the amount of light the location will provide. If the new tree likes full sun, then the site should provide sunlight all day long. If the tree prefers partial shade, then the site should provide the correct amount of light.

Site selection also includes a consideration of the soil. A good planting hole should be away from any caliche accumulations. Caliche, or a deposit of calcium carbonate, can slow water penetration to the roots, help accumulate salts in the root zone of the plant, and even be toxic to the plant. Sensitive trees, such as citrus, should not be subjected to the challenges of caliche.

To check for caliche, dig the planting hole and look for whitish or greyish deposits in the soil. They are easy to

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recognize. The color and texture of the deposited layer is one way. Another is to monitor how difficult it is to dig through the deposit. The stuff can be pretty hard. For the good of the plant, the problem must be resolved before planting. This should be done by either removing the caliche or by selecting another site.

With the site now selected, it is time to make sure the hole in the soil is appropriate for the tree. The hole must be just the right depth, no deeper than the bottom of the container holding the tree, and just the right width. The width of the tree hole will be determined by the diameter of the plant container. In hard, desert soils, research has indicated that the soil in a planting hole should be loosened three to five times the diameter of the plant container. This will allow the roots to grow out from the trunk of the tree and eventually become a full-sized root system. The last thing we want is for the roots to stay close in to the trunk. That is asking for trouble.

The way the tree is planted also impacts long term health. The first thing to remember is that torque on the root ball can damage the tender roots and lead possibly to tree failure once it is in the ground. The tree should therefore be gently removed from the container to prevent damage to the tender roots. In addition, the root system should never be allowed to dry out during the planting process. Do not remove the tree from the container until just before planting and then fill the hole with water after planting and while backfilling with soil to keep the roots wet and to avoid air pockets in the soil which could dry out and kill the affected roots.

New trees should be irrigated every day for the first couple of weeks or until new growth occurs. Once the branches begin to put out new leaves and start to grow, both key indicators of new root activity, then the irrigation frequency can begin to slow. Nevertheless, during each irrigation the water needs to run long enough to fill the entire root zone. This will ensure that all roots will remain moist.

At planting it is a good idea to place a slow release fertilizer tablet into the planting hole, but further applications of nitrogen should not be made for the first few months to avoid damaging the tender roots. A light application can be made from time to time as needed once new growth is consistent and established. After the first year, standard fertilizer applications, tailored to the size of the tree, can begin.

Finally, do not stress the plant unnecessarily. I see many people, for the sake of looks only, mulch right up to the trunk with landscape rock mulch. This is not a good idea. The rock tends to accumulate heat during the day and then radiates it back into the tree both day and night. This can stress out a young tree particularly, and even established trees. Instead of rock mulch, consider using an organic mulch, such as compost, to cool the soil and the environment under and around the tree.

While not every tree will make the transition from container plant to full maturity, we can help improve a new tree's chance for survival by properly preparing the hole, watering correctly after the tree is in the ground, and giving the tree proper care throughout its life.

Avoid Shallow-Rooted Plants

Plants with shallow root systems struggle to survive in our desert conditions. It is a basic rule of botany that the top of the plant and the bottom of the plant must match each other in stored energy. Small, shallow root systems on plants make it hard for the plant to store enough energy to meet its needs. A general decline in plant health usually results.

If I see a plant with a nice canopy of leaves and a full, mature size, I would expect a full-sized root system to match. A healthy, full-sized root system is one that extends out from the trunk or stem of a plant in a 360 degree circle, and at least to the outside edge of the canopy, the drip line of the plant.

What happens when the root system does not match the expected size and depth required for that plant? Let's consider a mature tree as an example. If a full grown tree has a root system that only goes out say two feet from the trunk where it should be going twelve, and down into the soil to a depth of one foot where it should be going three, the tree will often be unable to sustain a full canopy of leaves, and will often be stunted and sickly. No matter whether the suffering plant is a large tree, a small shrub, or a bedding plant, it will never perform at its best. Under the worst case scenario, well, it is not a pretty picture.

The key to developing full-sized root systems in the desert is proper irrigation. Yes, a caliche layer or a compacted soil can be a problem. I agree. Nevertheless, the most common cause of small and shallow root systems is the way we irrigate. Ideally, each and every root of a plant must be irrigated, each time. When this does not happen, root systems will not develop properly.

It is an established fact that roots generally do not extend themselves into dry ground. When they grow, they tend to stay where water is available. If a plant is not properly irrigated, that is, if the soil around the plant is not wetted out to the drip line, and if water is not allowed to extend down into the soil to the proper depth, the root system will not reach its necessary full size. If we irrigate shallow, we will cause our plants to become shallow-rooted.

Many of us have a drip irrigation system. Properly used, they are great tools that can save us a lot of time and water. Used improperly, they cause severe problems. Let's go back to our tree example. If I only have two emitters providing water to a large tree, where are the roots going to be? Absolutely! The roots will only be where those two emitters are distributing water. If my irrigation system does not encourage proper root development by placing water where the roots need to be, I am developing plants with a root system that is bound for failure sooner or later.

In a garden or landscape irrigated with a drip irrigation system, I have seen plant roots do a U turn out of a dry soil and grow back towards the moist soil on the other side of the plant. This just underscores what we are saying. Roots tend to accumulate in the wet spots. "What is wrong with that," you ask? There is plenty wrong with that, and the continued practice could end in the eventual death of the tree. Here is why.

First of all, the root system must anchor a plant in the soil. When the wind blows, the job of the roots is to keep the plant from falling over. How many have seen an uprooted tree that blew over in a wind storm? I bet it had shallow roots. In these cases, shallow root systems fail the plant in a basic responsibility.

Second, roots are responsible for picking up nutrients from the soil to help the plant grow and develop normally. A small, constricted root system that has all of its roots embedded in a relatively small area, is quickly going to mine out the nutrients available in that small space. Plants that run short of nutrients at any time are not going to be healthy for long.

Third, the root system, as mentioned before, is responsible for storing energy to meet the future needs of the plant. Energy produced from photosynthesis is never stored for very long in the leaves. There is too much chance that those leaves will be lost for one reason or another. A small, constricted root system will never be able to store enough energy to be of much benefit to the plant.

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Finally, roots create important compounds that benefit the extended plant in many ways. A small, miniature root system is just not going to have enough mass to make much of a difference there either.

For each of these four reasons, it is in the interest of the plant, especially if it is to live for any length of time, to develop a large, normal root system. That requires us to irrigate correctly.

Proper irrigation requires that we apply water, either with a hose or drip system, so that the water will wet all of the soil underneath a given plant. This is critical to encourage root growth and to leach out any harmful salts that may be accumulating in the soil.

Next, we must apply water often enough to fill the needs of the plants. While different plants have different water requirements, the general rule of thumb is that as the temperature goes up, so should our frequency of irrigations. As the weather cools, we can lengthen the time between irrigations.

Finally, when we irrigate, it is essential to allow the water to run long enough that it wets the soil down to the bottom of the root system. The expected depth of a root system of most trees is about three feet. For shrubs, it is two feet, and for bedding plants, it is about one foot. A long screwdriver or other type of soil probe will help determine how deep the water is going down into the soil after an irrigation. The probe will slide easily into wet soil but stop short when it hits dry ground. By placing your fingers at the surface of the soil before removing the probe, you will be able to tell the depth of irrigation.

Shallow root systems can be harmful to plants, but by irrigating properly every time we turn on the water, we can avoid creating plants with shallow root systems.

If you have questions about this newsletter, have any plant related problems, or wish to have a publication sent to you, please call (520) 836-5221 x204 or (520) 374-6263 and leave a message. If you have a plant problem and are able to email a picture, please send a picture with any information you can provide about the plant, and your contact information to our diagnostic team at macmastergardener@gmail.com and a Master Gardener will contact you.

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Pinal County Garden and Landscape Short Course Begins:

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Please contact Terry at (520) 709-1840 for more information.

Casa Grande on January 15, 2020.

Please contact BJ Seemuth at (520) 233-3317 for more information.