

Weeds in the Vegetable Garden, by Cassey Anderson, Horticultural Agent, Adams County

It's July, and the bountiful rainfall is nonjudgmental, so weeds are thriving along with your crops and ornamentals. Weeds are, by definition, a plant in a place we do not want them. It could be tempting to just leave them be, but many will outgrow and outpace desirable crops and take valuable nutrients and water from them, so management is important.

Perennials (think bindweed, dandelion, Canada thistle etc.) have large taproots or large root systems, and some may reproduce via their roots. This means that if you let them grow, they can refill the energy storage in their root system undoing your hard work. Perennials need to be killed completely into the root system or they will

Annuals (purslane, lambsquarters, redroot pigweed) grow new from seed each year, so if you can prevent the seeds from germinating (pre-emergent, mulch), or remove when very young (stirrup hoe, pulling) then you

For manual removal of weeds, you'll want several tools: your hands (or even better, a willing helper!), gloves, a soil knife or digger (I use a Hori Hori and adore it), and a stirrup hoe. For perennial weeds you want to remove

as much of the root as possible. Annual weeds can be removed successfully if only some of the root has gone,

There are many options for chemical control. Organic options include boiling water or burn down agents such

as clove oil, herbicidal vinegar, citrus oils etc. Be aware these won't kill the whole plant and likely will need repeated applications once it regrows. Conventional systemic herbicides applied carefully and appropriately

can also give good weed control (always read the label). Focused treatment is always better than broadcast treatment so be sure to apply only to the weed. Contact your local Extension office for specific

The first thing to know about your weeds is their life cycle. Are they annual or perennial?

prevent them from going to flower/seed and you can reduce or eliminate the population.

although removing too little may mean it can grow back.

recommendations for your types of weeds.

return year after year.





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Annie Costakis, CMG Coordinator, Broomfield County

Wondering how to get involved with CSU Extension? In addition to our Colorado Master Gardener program, we offer free programming to anyone interested in learning more about horticulture. Check out our calendar on Compass for classes and events that may interest you. We offer youth and adult vegetable garden classes held at our teaching garden at Brunner Farmhouse in Broomfield - while these classes are free, please note that they require registration. We encourage you to register early, as many classes go to a waitlist. Our Master Gardeners also hold Ask a Master Gardener booths at the Broomfield Library and around the community. Lastly, we offer tours of the Broomfield Xeriscape Demonstration Garden during the summer. If you have any questions, feel free to contact csuextension@broomfield.org





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David Charles Henshaw Austin, OBE, was born on February 16, 1926 in Albrighton England. He died on December 18, 2018, throwing the entire rose growing world into mourning for over a year. As a rosarian of some 60 years, I have said before and will say again; there are roses, and then there are Austin roses.

Mr. Austin was a self-educated horticulturalist who spent a lifetime creating 200 new roses of breathtaking beauty and astonishing fragrance. He wished to breed roses with the grace, character and rich fragrance of old garden roses that were also capable of repeat blooming.

In addition, Mr. Austin wanted to expand the color palette of the old roses like gallicas, damasks and albas. Hybrid teas, floribundas and other modern roses are renowned for their color, sometimes at the expense of scent. Austin set out to keep both, color and scent. He did.

David Austin roses are known as English Roses. Resilient and robust shrubs, they open to resemble a peony at full bloom.

He named his roses after members of his families, famous people, great writers and the characters they created. In fact, he named so many roses after writers and characters in great books I admire, that as an old rosarian with limited space I couldn't settle on one. Until 2018, that is, when just before his death he created 'Emily Bronte.' Ms. Bronte is my favorite English poet.

'Emily Bronte' is a very pale pink shrub rose with the central petals deepening to an apricot color. She stands 4 feet high with a width of $3\frac{1}{2}$ feet. A strong tea rose scent billows from her long-lasting blooms that repeat throughout the season.

Requiring only five hours of sun a day, 'Bronte' tolerates some shade. She gave me a lovely show this spring on the second year in the garden, as the attached photos demonstrate.









'Blue Danube' Hydrangea blooms in a range from reds to blue. Image from Schreiber, et. al., 2001



Chemical complex of the blue anthrocyanin pigment (blue) with aluminum ion (red), and other copigments (black). Image modified from Houghton, et. al., 2021.



The Science of Gardening

<u>The Red, White, and Blues of Flower Color</u> <u>By Kristin A. Moore, Ph.D.</u>

During my last article I described the role that genetics can play in flower color. This month I will discuss the contributions that environments make on flower colors. One of the most well-known examples of environmental impacts on flower color is the effect of changing soil pH on hydrangea blooms. In acidic soils (pH < 5.5) hydrangeas bloom in blue hues, in slightly more neutral soils (pH: 5.5-6.5) they are often purple, and in soils with a pH above 6.5, such as those of the front range, hydrangeas bloom in pinks. Changing the pH of the soil can be accomplished by either adding lime (to increase pH – make it more alkaline) or sulfur-based compounds (to decrease pH – make it more acidic). However, these pH changes only indirectly effect the pigments that give color to our blooms. To fully understand why, we need to look at both the pigments and how they interact with other components of the cells they reside in.

The specific pigments that give most flowers their red, purple, or blue hues are called anthrocyanins. There are many different varieties of these pigments all with a very similar overall chemical shape, but with slightly different atoms attached that change the way they absorb and reflect light, and thus change the color they produce. Anthrocyanins are in fact highly impacted by pH, and pH alone can change whether a single pigment reflects red, blue, or a combination of red and blue (purple) light. However, within a plant cell, pH is highly regulated, meaning that changing the pH of your soil is not going to impact the pH within the cells of the plant.

So how does pH impact flower color? It changes the bioavailability of other soil components, which can then be taken up by the plant and will interact with the anthrocyanin pigments. In the case of hydrangeas, it is aluminum (Al) bioavailability that changes with pH. In acidic soils elemental aluminum ions (Al3+) are easily absorbed by the plant. However, at more neutral and alkaline pHs Al becomes incorporated into other compounds and is not available to the plant. When aluminum is available it stabilizes the highly unstable anthrocyanin that is specifically required to produce blue colors, and Aluminum allows this pigment to form complexes with other compounds in the cell. These interactions cannot happen when Al is not available, which results in the purple to reds blooms that we observe in alkaline soil.

While this is not to say that throwing aluminum at your plants will magically turn blooms in our alkaline soils from reds to blues (especially since excess Al is actually quite toxic to plants), but it does illustrate how complex the interactions between plant genes, internal cellular chemistry, and the external environment can be.

Citations: Houghton, A., Appelhagen, I., & Martin, C. (2021). Natural Blues: Structure Meets Function in Anthocyanins. Plants, 10(4), Article 4. <u>https://doi.org/10.3390/plants10040726</u> Schreiber, H. D., Jones, A. H., Lariviere, C. M., Mayhew, K. M., & Cain, J. B. (2011). Role of aluminum in red-to-blue color changes in Hydrangea macrophylla sepals. BioMetals, 24(6), 1005–1015. <u>https://doi.org/10.1007/s10534-011-9458-x</u>

Vegetable Gardening

<u>Kim Poland</u>

Welcome to Gardening in the New Colorado! As a native of Colorado and an avid gardener, I never thought I would be concerned about the amount of moisture we are receiving. But I would take this over the alternative any day! That being said, I'm sure you have noticed a significant difference in your garden this year compared to last year. Sometimes, too much of a good thing can be detrimental. All this rain is causing soil compaction and preventing oxygen from reaching the roots, which is just as crucial as water. The lack of oxygen slows down root development and leads to stunted plant growth. It's important not to work the soil in this wet weather, as it will further compact the soil. Additionally, the excess moisture is leaching nutrients from the soil, causing nutrient deficiencies in your plants and hindering their growth and fruit development. However, if there is a lot of rain expected within the next 24 hours, it's not advisable to add fertilizer. The rain will leach it through the soil before the plants have a chance to absorb the necessary nutrients. When you have the opportunity, it's important to fertilize your vegetables based on their specific nutrient needs, especially if your soil lacks organic material.

To prevent the spread of soil-borne diseases such as Early Blight, Verticillium wilt, and Fusarium wilt, it's helpful to add a layer of light mulch on top of newspaper in your vegetable garden, particularly around your tomatoes, peppers, and eggplants. Trimming the lower leaves of your plants and promptly removing any leaves with black spots or yellowing can also be beneficial. Remember to wash your hands and sanitize your tools afterward, as these diseases can be carried by soil-borne pathogens. It's also important to keep weeds out of your garden, as they can harbor the same diseases. Weeding may not be the most enjoyable task, but it's crucial!

Just as oxygen is essential in the soil, proper airflow around your plants is important for disease prevention. A drier environment is less favorable for diseases, and airflow helps to dry out the plants. Trellising your vegetables can improve airflow and keep the leaves and fruits off the ground, reducing the risk of diseases. There are various trellis options available, so choose the one that suits your garden and crops best.

Pruning also plays a vital role in promoting airflow, especially for indeterminate tomatoes. Pruning not only improves air circulation, which helps keep diseases at bay, but it is also important for fruit development. Removing the "suckers" on tomato plants redirects the plant's energy towards fruit production. This is the perfect time to start pruning your tomatoes.

With this cooler and wet spring, patience will be key. The heat will come, and everything will flourish!

"Gardening is learning, learning, learning. That's the fun of them. You're always learning." - Helen Mirren











Earwigs

Aphids















Slugs





Sustainability

<u>What's Eating My Garden?</u> <u>Betty Emanuele</u>

The boundaries of Adams and Broomfield Counties are artificial, made by political entities, not nature. Within these boundaries conditions are extremely variable – soils, temperatures, winds, moisture, elevation, and population density, to name a few. Parts of the area are urban with limited open space, while others are farms with thousands of acres – and then there are the pockets between them, in acreage and population. Trying to come up with a list of current insect populations that is "one-size-fits-all" just isn't possible. So. . . . I've given that idea up!

A list of the culprits that may or may not be ravaging your gardens, both vegetable and ornamental, will follow. I've included pictures and links to Extension publications.

Aphids have many host plants and populations can increase exponentially. They can be knocked down with a strong blast of water, and beneficial insects often will come in and help.

Earwigs are generally beneficial, but classified as a nuisance pest. They can do extensive damage to seedlings and young transplants,

Flea beetles are jumping insects that chew small holes in plants and leaves. They are most harmful when plants are young and tender.

Grasshoppers are the most difficult insect to control because they can fly long distances, and there are more than 100 species in Colorado.

Japanese beetles cause significant damage to their host plants. They are moving throughout Adams and Broomfield Counties. They are very difficult to control.

Leafcutter bees are great pollinators that cut half circles out of leaves, which they use to make nests. Their damage is more cosmetic than harmful and can only be controlled by covering the plants with protective cloth.

Pillbugs feed on decaying plant matter and small plants, and generally don't cause significant harm. They can invade homes when the weather gets colder.

Slugs aren't usually a major problem, but they like rain and humidity, so they've been more visible this season. They can be extremely damaging if left uncontrolled.

Squash bugs are the most destructive insects of winter squash and pumpkins, but also infest zucchini and yellow squash.

https://extension.colostate.edu/topic-areas/insects/grasshopper-control-in-gardens-small-acreages-5-536/ https://extension.colostate.edu/topic-areas/insects/slugs-5-515/ https://extension.colostate.edu/topic-areas/insects/flea-beetles-5-592/ https://extension.colostate.edu/topic-areas/insects/squash-bug-management-in-home-gardens-5-609/ https://extension.colostate.edu/topic-areas/insects/japanese-beetle-5-601/ https://extension.colostate.edu/topic-areas/insects/european-earwigs-5-533/ https://extension.colostate.edu/topic-areas/insects/leafcutter-bees-5-576/ https://extension.colostate.edu/topic-areas/insects/millipedes-centipedes-and-sowbugs-5-552/

Native

Plants

Native Gems in the Summer Garden Rebecca Fitzpatrick

Accustomed to our climate and soils, native flowers are a natural choice for enhancing your successional bloom time in the garden. Here are some summer stars for your consideration.

Purple Prairie Clover, Dalea purpurea

Dalea blooms bottom up on its wiry stems, looking like little ballerinas in tutus. The inflorescence makes its way up the central spike to finish as fuzzy purple cylinders. Dalea is a legume and hangs out happily with native grasses like Little Bluestem. At 1-2' tall, it likes its space and loves the sun, blooming from May to September.

Scott's Sugar Bowl Clematis, Clematis scotia

These precious bell clematis are slow-growing and so worth the wait. Sugar Bowls are late spring through early summer bloomers. As with many clematis, the fuzzy, white seed heads are possibly as showy as the deep blue, 1" nodding bells. This is a non-vining, bush clematis that grows in an upright clump about a foot tall and slightly wider. This plant will take full sun with some irrigation as well as afternoon shade if drier conditions exist.

Prairie Coneflower or Mexican Hat, Ratibida columnifera

Sassy little coneflowers. They will cross pollinate so if you want to keep your yellows and reds separate, you may want to plant them well away from each other. It naturalizes easily and self sows, so consider well where you plant it. The drooping petals surround a central long disk, resembling a sombrero, hence its nickname. Give it full sun and it will reward you with snazzy clumps of 1-3' tall stems from June to September. It's not fussy, though, part shade will work to0.

Photo credits: Dalea, Monarda: Rebecca Fitzpatrick Ratibida: adams.extension.colostate.edu Scott's Clematis: Kirk Fieseler for plantselect.org





<u>Meet Bee balm</u> Monarda didyma Ruth Vazquez



Do you know this early summer bloomer Bee Balm? Botanical name Monarda didyma, can locally be found in red or bright pink.

Its shaggy blossoms 1.5" - 2" in diameter are a welcome sight in the perennial garden as the tulips and other spring bulbs are gone and the poppies and Dianthus are fading away. Monarda will tide you over until the Cone flowers and Agastache do their thing.

Found beside streams in East Tennessee, the surprise is how well they are growing in the Xeric Garden, Section 1, at Riverdale Regional Park and Fairgrounds (formerly Adams County Fairgrounds.) They do get moderate water rather than low water.

When the first blooms fade out, cut the stems back to a couple of inches up from the ground to encourage re-blooming.

There are over 50 cultivars of Monarda and are found all across North America. No surprise, the bees love this plant! But also other good pollinators like butterflies and hummingbirds flock to Bee Balm.

This plant will grow in shade and heavy clay soils, if asked. But give it some space and don't water too heavily as it is subject to powdery mildew.

It is in the mint family and believed to have been used as a tea substitute after the famed Boston Tea Party tossed the English tea overboard in 1773. It is used medicinally by many who enjoy using herbs this way.

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