TEXAS MASTER GARDENER
TEXAS A&M AGRILIFE EXTENSION
Bastrop County

What's Growing On?

BASTROP COUNTY MASTER GARDENER ASSOCIATION

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Forest Tent Caterpillars

By Wizzie Brown

Forest tent caterpillars cause damage in the larval, or caterpillar, stage. Caterpillars are a greyish-brown color with bright blue and yellow stripes running down the sides of their body. The back of the caterpillar has white shoeprint/keyhole markings. Larvae also have fine white hairs over their body but are not a stinging caterpillar.

These caterpillars, although called tent caterpillars, do not make an actual tent like others in their group. Other tent caterpillars make a web between two branches where they join or split from each other. Forest tent caterpillars make a silken mat on the tree trunk or large branches where caterpillars gather in groups between feedings.

Forest tent caterpillars appear once a year, typically in April. In some years outbreak populations can occur and numerous caterpillars can be seen in certain areas. They chew foliage of trees, usually deciduous hardwoods. Even though the caterpillars eat foliage, many trees can withstand 20% loss of foliage without being harmed. Concern should be when other stressors are apparent along with the caterpillars, such as drought or disease.

If the need to manage forest tent caterpillars occurs, less toxic active ingredients that can be used to treat foliage are *Bacillus thuringiensis* (Bt) *kurstaki* or spinosad. Another option would be to treat the silken mat with a pyrethroid product when the caterpillars are resting there.

For more information or help with identification, contact Wizzie Brown, Texas AgriLife Extension Service Program Specialist at 512.854.9600.

TEXAS A&M AGRILIFE EXTENSION

Inside this issue:

Epsom Salts—Miracle Cure or Myth?

By Howard Nemerov

Over the years, I've read and heard of people using Epsom salts on everything from tomatoes to roses, to cure plant insect and disease problems and improve plant yield and performance. I accepted these claims because "everybody says so." But what does the science say?

Claim: "Epsom salts cure blossom end rot."

As spring turns into summer each year, our weather transforms from a relatively cool and wet to hot and dry. For tomato growers, this is Blossom End Rot (BER) season, a plant disorder "caused by non-living factors including environmental stresses or improper cultural practices." BER occurs most often "when plants have been provided adequate and consistent soil moisture, and are rapidly growing, succulent plants, and then are suddenly exposed to a period of drought." It is caused by "calcium deficiency in developing fruit," but this doesn't mean you have a *soil* deficiency.[1]

With sudden onset of hot, humid weather, plant transpiration is reduced. And plant transpiration is the driving force for absorption of calcium in the soil by roots. Tomato plants become temporarily unable to provide enough calcium, even if there's plenty in the soil. Tomato plants normally absorb calcium ions dissolved in soil moisture via their roots, moving the calcium up the plant, and delivering it to fruits. Such changes in temperature and humidity disrupt normal soil moisture levels, reducing the amount of calcium-laden water entering fruits.

Remember: this is usually an environmental/cultural issue, not a soil deficiency, which is why best management practices include:

- Maintaining uniform and adequate soil moisture during periods of heat and minimal rainfall.
- Mulching plants to help maintain adequate and consistent soil moisture.
- Avoiding injury to roots by restricting cultivation.

Also, avoid over-fertilizing with nitrogen and phosphorus. High phosphorus levels can impede calcium uptake.[2]

It's possible that your soil has calcium deficiency. However, with our alkaline soils, calcium deficiency is unlikely. It's always a good idea to get a soil test before spring planting, just to be sure. Due to Bastrop being over the Carrizo-Wilcox Aquifer, our groundwater contains calcium-bicarbonate.[3] All but a small western margin of Bastrop County lies over this aquifer.[4] Local soils contain limestone and glauconite,[5] both of which contain calcium and magnesium.[6,7] Your soil may be an exception—acidic and/or magnesium deficient—underscoring the need to get a soil test to know *your* soil needs. For example, if you have upland soil—relatively higher elevation—with light-colored sandy loam,

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Volunteering

Master Gardeners volunteer in the community to teach others about horticulture. We follow the research-based recommendations of Texas A&M AgriLife Extension. Members who complete 50 hours of volunteer service in the year after training earn the designation "Texas Master Gardener." We use our title only when engaged in Texas A&M AgriLife Extension activities.

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your soil may be acidic, even though most Bastrop County soil is alkaline.[8]

For those using well water, a water analysis is also a good idea. For those on municipal water, your supplier should be able to provide an analysis that includes magnesium and calcium levels, plus pH. For example, Bastrop city water contains about 72 parts per million of calcium, 19 ppm of magnesium, with a pH of 7.5 (weakly alkaline).[9] Since magnesium is a secondary plant nutrient, it's likely that your soil and water already provide enough.

Which brings us to the original question: does adding Epson salts reduce BER? Adding something your plants don't need can cause more problems. Once tomato plants and watering schedules adapt to summer weather, tomatoes are able to pump more calcium from soil to fruit, and BER clears up. During this transition period, people apply various home remedies, and because BER resolves, they believe these remedies helped. In statistics we say "correlation does not prove causation." BER would clear up in 99% of these cases anyway with adequate soil moisture.

One often-recommended BER "cure" is Epsom salts, or Magnesium Sulfate ($MgSO_4$).[10] However, research shows that adding unnecessary magnesium to your soil may exacerbate BER.

> *"Adding Epsom salt to the soil may create more [blossom end] rot since magnesium and calcium ions compete for uptake into the plant. The more magnesium in the soil, the less chance that calcium will be absorbed."* [11]

Science Primer

A little chemistry helps explain why this is true. Magnesium and calcium atoms have certain similarities that make them compete for the same "space" on the absorption surfaces of roots. Calcium and magnesium each have two 2 "free" electrons that link up with other molecular components to create compounds, in this case salts,[12,13] where one atom combines with sulfate (SO_4) to create Calcium Sulfate ($CaSO_4$) and Magnesium Sulfate ($MgSO_4$), respectively.[14,15]

Imagine that you have a barrel filled with green (Mg) and red (Ca) balls. You don a blindfold, and then begin selecting balls at random. Your goal is to end up with about 50% each of green and red balls. If the barrel begins with 50% of each, random selection means your final selection will be close enough to be satisfactory. However, if somebody sneaks in hundreds of green balls while you're blindfolded, your random selection ends up with an unsatisfactory percentage of green balls. This can happen to your tomatoes after applying Epsom salt to soil: An over-abundance of soil magnesium results in insufficient calcium levels, leading to Blossom End Rot caused by unbalanced nutrient levels.

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New Website Features

Check out our website, which features project slideshows, a new photo gallery section, and an events calendar to check out upcoming activities. Find news articles and our newsletters. Thanks to Dave Posh for keeping the info timely for us https://txmg.org/bastropcounty/

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If your soil test indicates magnesium deficiency, then Epsom salt may help you grow better crops, be they juicy tomatoes or large, healthy flowers. But you must also consider soil salinity when choosing a magnesium amendment. Adding salts may cause plants to die from dehydration. Tony Provin, Professor and Extension Specialist at the Texas A&M soil testing lab, notes:

> *"If your soil has a high salinity content, the plants growing there will not be as vigorous as they would be in normal soils. Seeds will germinate poorly, if at all, and the plants will grow slowly or become stunted. If the salinity concentration is high enough, the plants will wilt and die, no matter how much you water them."*
>
> *"This is because the plant roots contain varying concentrations of ions (salts) that create a natural flow of water from the soil into the plant roots.*
>
> *"As the level of salinity in the soil nears that of the roots, however, water becomes less and less likely to enter the root. In fact, when the soil salinity levels are high enough, the water in the roots is pulled back into the soil."* [16]

Claim: "Epsom salt isn't a real salt."

This is the old "something for nothing" myth, implying that when it comes to Epsom salt, you can apply it without affecting soil salinity. On Facebook—where keyboard + broadband = expert—I read one post by a small farmer claiming "you can't add too much Epsom salt." PubChem, a website maintained by the National Institutes of Health, uses the word "salt" 29 times on their "Magnesium Sulfate" page.[17] PubChem notes: "A salt is simply an inorganic mineral that can dissolve in water." Epsom salt is—as reported by Tony Provin[18]—a "typical" salt found in irrigation water.[19] Adding Epsom ***salt*** increases salinity because that's what salts do.

Claim: "Epsom salt contains sulfur, which acidifies alkaline soil."

If you have alkaline soil, adding ***elemental*** sulfur can lower pH, or acidify your soil.[20] Another option is aluminum sulfate, which has a pH as low as 2.9, or excessively acidic.[21] Epsom salts are neutral, around pH 7.[22]

Claim: "Epsom salt grows better roses."

One myth is that Epsom salts increase production of basal breaks, or new shoots, because of insufficient soluble magnesium in the soil. Tommy Cairns holds a Ph.D. in Chemistry and Biochemistry and is Past President of the American Rose Society. Regarding Epsom salts improving rose performance, he notes:

> *"Scientific studies, however, discount this connection. Unless there is a severe magnesium deficiency in the soil, applying Epsom Salts will have little effect."*

Dr. Cairns agrees that "intermittent, not regular" Epsom salt applications may help if you have magnesium deficient soil.[23]

Linda Chalker-Scott, Ph.D. is an Extension Urban Horticulturist for Washington State University. She agrees that there is "no published, scientific research" showing that Epsom salt increases basal breaks

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or root development. She also agrees that Epsom salts can help with magnesium deficiency.[24]

Claim: "Epsom salt is a weed killer."

There are many sources claiming that a mix of Epsom salt, vinegar, and dish soap is an effective weed killer. For example, one blog site claims:

> *Over decades of research, there are three common ingredients that have proven effective at killing weeds at home time and time again. You will likely find these same ingredients in most homemade weed killer recipes:*
>
> - *Vinegar*
> - *Salt (or Epsom Salt)*
> - *Detergent*[25]

As with nearly all blog sites promoting this elixir, the author has no horticulture-related degree. Her claim is anecdotal, and she admits that this mixture kills leaves but not roots. Which brings us to the science.

While there's no science that adding Epsom salts makes an effective weed killer, horticultural vinegar (up to 20% vinegar solution; not distilled 5% white vinegar from the supermarket) is an effective contact spray for broadleaf weeds. Vinegar may also burn back grass temporarily, until it regenerates from roots.[26] If you're trying to eradicate Bermuda grass to create a vegetable bed, vinegar won't work.

Dish soap is a surfactant. Adding a few drops can enhance coverage when using vinegar as a weed killer. Still, vinegar works best on "very small annual broadleaf weeds" that are least able to regenerate from their immature root system.[27]

Conclusion

There appears to be no science showing the Epsom salts provide any benefit beyond resolving magnesium deficiency, which may be a problem in acidic, sandy soils. However, in acidic soils with magnesium deficiency, dolomite is the better option because it also balances pH, and is less likely than Epsom salt to raise salinity levels.[28]

Epsom salts have some medical benefit. Mayo Clinic says it's used for "short-term relief of constipation" and "as a soaking solution to relieve minor sprains, bruises, muscle aches or discomfort, joint stiffness or soreness, and tired feet."[29] If you have leftover Epsom salt after reading this article, perhaps take a nice, relaxing bath tonight while contemplating what you'd like to do next in your garden.

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Endnotes

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