

Garden Mythbusting

What makes an Informed Gardener?

- Understanding how plants work
- Knowing how/what/when/where to plant
- Using critical thinking skills and relevant science to identify good products and practices

Seminar roadmap

- Evaluating information
- Assessment of products and practices
 - Science doesn't support
 - Misapplied science (agricultural production)
 - Overextrapolation
 - Biased reporting
- What products or practices are YOU curious about?

Using the CRAP test to evaluate gardening information*

*Adapted from "Evaluating Information - Applying the CRAAP Test" (Meriam Library, California State University, Chico CA)

- Credibility of the source
 - Author's credentials and qualifications?
 - Publisher?
 - Website urls?
- Relevance to urban landscapes and gardens
 - Crop production or home gardens?
 - Geographic or other constraints on usability?
- Accuracy
 - Science-based?
 - Objective?
 - Current?
 - Well-written?
- Purpose
 - Educational or commercial?
 - Political, ideological, cultural, religious, or personal biases?
- When in doubt, consult with Extension specialists.

1. Science doesn't support

- Products
 - Compost tea
 - Kelp products
 - Water crystals
 - Companion planting
 - Fertilizer injections
 - Foliar fertilizers
 - Lasagna mulching
 - Leaving rootballs intact
- Practices

Claim: Compost tea fights plant diseases and improves soils

- Science behind compost tea and disease
 - In general, mixed results in the lab and the field in controlling disease
 - ACT less effective than NCT in controlling pathogens and can make problems worse
- Science behind ACT and soils
 - Virtually no differences between soil treated with water and ACT

- Compost has much greater nutrient content and many more microbes than ACT
- Scientific summary
 - ACTs have no consistent value in disease control or as a fertilizer
 - ACTs are not legal pesticides
 - ACTs can contain pathogens
 - ACTs are expensive and energy-wasteful compared to compost

Claim: Lasagna mulching creates a healthy, nutrient rich soil

- About lasagna mulching
 - “a no-till method of layering brown and green materials to increase organic matter”
 - Emotional appeal
- Scientific summary
 - Sheet mulches reduce water and air availability to roots
 - Overuse of any nutrient can create soil, plant and water problems

2. Misapplied science

- | | |
|---|---|
| <ul style="list-style-type: none"> Products <ul style="list-style-type: none"> Epsom salts Phosphate fertilizer | <ul style="list-style-type: none"> Practice <ul style="list-style-type: none"> Amending soil before planting |
|---|---|

Claim: Epsom salts are a “safe, natural way to increase plant growth”

- About Epsom salts
 - Magnesium sulfate
 - Used as a source of magnesium in production agriculture
- Scientific summary
 - No science behind pest control efficacy
 - No science behind home garden and landscape use
 - No science supporting the use of Epsom salts where soil magnesium is adequate

Claim: phosphate fertilizer enhances root growth of new transplants

- About phosphorus
 - Can become deficient in production agriculture (along with N and K)
 - Most non-agricultural soils have enough phosphorus
- Scientific summary
 - Phosphorus competes with iron and manganese uptake
 - Excess phosphorus inhibits mycorrhizal fungi, so roots work overtime
 - Excess phosphorus pollutes aquatic systems

3. Overextrapolation of results

- Corn gluten meal (CGM)
- Harpin
- Mycorrhizal inoculants

Claim: mycorrhizal inoculants improve root growth and plant establishment

- About mycorrhizae
 - Beneficial fungi that expand plant root reach and enhance water and nutrient uptake
- Scientific summary
 - In the greenhouse
 - Inoculants can work in container plant production to “jump start” sterile media
 - In the landscape
 - Healthy soils have their own populations of mycorrhizae
 - Unhealthy soils won’t support mycorrhizae

4. Biased reporting

- 🍃 Highlighting positive results (often with statistical errors)
- 🍃 Downplaying lack of efficacy

Claim: biodynamics stimulate vitalizing and harmonizing processes in the soil

- 🍃 About biodynamics
 - 🍃 Philosophy based in alchemy, astrology, and homeopathy
 - 🍃 Scientific inquiry rejected by inventor
 - 🍃 Compared to traditional organic techniques, biodynamic preparations have no effect on soils or plants
- 🍃 Vine nutrition and winegrape analyses - results
 - 🍃 “Based on the fruit composition data, there is little evidence the biodynamic preparations contribute to grape quality.”
 - 🍃 “The differences observed were small and of doubtful practical significance.”
- 🍃 Vine nutrition and winegrape analyses - abstract
 - 🍃 “...the biodynamic treatment had ideal vine balance for producing high-quality winegrapes...”
 - 🍃 “Biodynamically treated winegrapes had significantly higher ($p < 0.05$) Brix and notably higher ($p < 0.1$) total phenols and total anthocyanins in 2003.”

General alternative to many of these products and practices

- 🍃 Perform soil tests before adding any nutrient (with the exception of nitrogen)
- 🍃 Use a nitrogen fertilizer at transplant time
- 🍃 Use organic matter as “slow food”
- 🍃 Maintain healthy soil conditions to support native populations of beneficial microbes
- 🍃 Apply mulch in ways that mimic nature: fine materials at the bottom, coarse materials at the top. Don’t use sheet mulches.

General caution: Correlation vs. causation

- 🍃 A correlation between two variables does not mean that one causes the other
- 🍃 Controlled studies can determine causation but not always feasible
- 🍃 Correlations can be valuable, but only if examined rigorously and eliminating other possible causes of the observed phenomenon

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