

# Evaluating arboriculture products and practices: What works, what doesn't, and why

## Seminar roadmap

- ✦ Sources of information
- ✦ Evaluating information
- ✦ Assessment examples
  - ✦ Products
  - ✦ Practices

## Types of information

- ✦ Scientific - peer reviewed, academic audience
- ✦ Gray - not peer reviewed, professional audience
- ✦ Popular - not peer reviewed, general audience

## 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

## Assessment of products and practices

- ✦ Science doesn't support
- ✦ Misapplied science (agricultural production)
- ✦ Overextrapolation
- ✦ Biased reporting

### 1. Science doesn't support

- | ✦ Products                          | ✦ Practices                |
|-------------------------------------|----------------------------|
| ✦ Compost tea                       | ✦ Companion planting       |
| ✦ Kelp products                     | ✦ Fertilizer injections    |
| ✦ Vitamin B-1 transplant fertilizer | ✦ Foliar fertilizers       |
| ✦ Water crystals                    | ✦ Lasagna mulching         |
| ✦ Wound dressings                   | ✦ Leaving rootballs intact |

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**

• Products

- Epsom salts
- Gypsum
- Phosphate fertilizer

• Practices

- Amending soil before planting

*organic matter  
soil content - 5%*

*soil testing - do it!  
easy to build up*

*nearly impossible  
to back down*

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

- 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 only at transplant time
  - ✦ Use organic matter as “slow food”
  - ✦ Maintain healthy soil conditions to support native populations of beneficial microbes
  - ✦ Nothing substitutes for adequate soil moisture: protect soil from compaction and evaporation
  - ✦ Apply mulch in ways that mimic nature: fine materials at the bottom, coarse materials at the top
  - ✦ Don't use sheet mulches
- arborist wood chips best*

**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

For more information

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