

**To:** Ryan Zajda, LBUSD  
**CC:** Christian Galindo  
**From:** John T. Law Jr., Ph. D. Director of Technical Services  
**Date:** 6/19/2018  
**Re:** Laguna Beach Unified School District Organic Landscape Management

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This memo presents an overview of the “organic” IPM program that BrightView will perform for the Laguna Beach Unified School District. Weeds are the *main* pest target of landscape maintenance programs. Insect pests and diseases are typically not significant in coastal California landscapes.

- Hand weeding and string trimmers every time we are on site.
- Monthly applications of the organic-herbicide Avenger
- Optional application of the turf bio-herbicide: Fiesta FeHEDTA

## **Ornamental bed and bare ground weed control**

Ornamental bed and bare ground weed control will be by hand and with the contact organic-herbicide d-limonene (citrus oil), or Avenger. Avenger is OMRI certified for use in Organic growing. It does not contain any chemicals or synthetic materials.

When applied to growing plants in sufficient quantities, d-limonene acid rapidly desiccates green tissue by removing the waxy cuticle of the plant and disrupting the cell membrane, resulting in cell leakage, causing tissue death. It is not translocated in treated plants and provides no residual weed control. It is only effective as a post-emergent herbicide and provides burndown of both annual and perennial broadleaf and grass weeds.

**Weeds germinate all year in coastal Southern California.** It is important that these young immature weeds be sprayed with Avenger organic herbicide. Perennial weeds and annual weeds that recover from hand weeding or Avenger applications must be resprayed before the new growth is too mature for Avenger to be effective. Control of perennial grasses like bermudagrass, kikuyugrass and perennial broadleaf weeds like Oxalis, bindweed and nutsedge can take many applications before the underground portions have exhausted their energy reserves. If the recovering weeds are allowed to regrow too much they will recharge the underground energy reserves.

## String Trimmers

The top growth of older weeds can be controlled by using a string trimmer. Annual broadleaf weeds are more effectively controlled than annual grasses because the growing points of grasses are usually below ground. Most perennial weeds are not controlled using string trimmers but will make them less noticeable.

## Turf Weed Control

Many turf weeds are prevented by thick, properly irrigated and fertilized turf. Open spaces in the turf are likely to be invaded by weeds.

The proposed broadleaf turf bio-herbicide is Fiesta or similar product that contains the active ingredient chelated iron. These iron (Fe) products are considered mineral based materials. This form of iron (Fe) is soluble and readily available for plant uptake, causing iron oxidation. Since broadleaf weeds absorb Fe-HEDTA more easily and in higher quantities than turf, weeds are impacted almost instantly while the turf remains unharmed. Iron oxidation causes the weed to quickly dry up, turn black, shrivel, and die within hours of application. FeHEDTA is applied to actively growing small weeds in turf when temperatures are cool. Treatments are reapplied 4 weeks after the first application for long term control with up to four applications per year. A darkening of turfgrass leaf blades can occur after treatment. However, the grass will generally recover within a few days to a week.

## Turf Fertility

The most efficient and sustainable fertilizer is controlled release polymer coated urea. Urea is a chemical substance that is found in all species of animals and plants. Urea-containing creams are used as topical dermatological products to promote rehydration of the skin. Urea 40% is indicated for many skin conditions. Oral and injected urea has a number of medical uses. An alternative name for urea is carbamide.

## Mulch

Much application requires considerable labor for bulky material handling.

Mulch is bark and other wood products placed on the soil to cover and protect it. Bark last much longer than wood. Mulches suppress annual weeds by limiting light required for weed establishment. Perennial weeds such as field bindweed and nutsedges often have sufficient root reserves to enable them to penetrate even thick layers of mulches. Some annual weeds will grow through mulches, while others may germinate on top of the mulch as it decomposes. Weeds that are a particular problem are those that have windborne seeds such as common groundsel, prickly lettuce, and common sowthistle.

Bark chips are moderate-sized particles (1/4 to 1/2 inch) and have moderate to good ability to withstand decomposition, while bark nuggets are larger in size

(1/2 to 1 1/2 inches) and have excellent stability over time. All of these can be used in landscape beds planted with herbaceous or woody ornamentals. Larger mulch pieces (greater than 1 1/2 inch) do not provide good weed control the space between the pieces allows weeds to grow through.

The thickness or depth of mulch necessary to adequately suppress weed growth depends on the mulch type and the weed pressure. The larger the particle size of the mulch, the greater the depth required to exclude all light from the soil surface. Coarse-textured mulches can be applied up to 4 inches deep and provide long-term weed control. Fine-textured mulches pack more tightly and can be applied to a depth of about 2 inches. If the mulch is too decomposed, it is a weed growth medium rather than weed preventer. It is important to periodically replenish organic mulches, regardless of particle size, because of decomposition, movement, or settling. If seedlings germinate in mulches, a light raking, hoeing, or hand-weeding will remove the young weeds.

## Important Pest Control Terms

It is important to define some terms to avoid confusion among all the public school stakeholders. A pest is a harmful, or potentially harmful, plant, insect, fungus, animal etc. CalEPA, the California Environmental Protection Agency defines *anything* that kills *any kind of pest* as a pesticide. An herbicide is a pesticide that kills plants, an insecticide is pesticide that kills insects etc. We at BrightView generally know what the citizens of Laguna Beach mean by *non-toxic organic*. However, the term non-toxic organic cannot be used in a legal pest management plan as regulated by California Healthy Schools Act (HSA). Pest Management Plans must also comply with the California Department of Pesticide Regulation (DPR).

### Toxicity – “The dose makes the poison”

All chemicals, including natural organic bio-pesticides such as orange oil (d-limonene) lemongrass oil (natural mix of myrcene, citronellal, geranyl acetate, nerol, geraniol, neral ) are toxic if exposure is high enough. Consequently, toxicity is dependent on the dose an individual receives compared to one’s body weight, although children are more sensitive to chemicals than adults. Undiluted, the above natural oils are considered to be moderately toxic. However, when diluted with water for use, these natural oil herbicides are considered to be low in toxicity because a person would have to consume an impossibly large amount of diluted product.

Of course, consuming chemicals is not the only way to be harmed by chemicals. Bio-herbicides work by desiccating or “burning” the weeds by damaging the weed’s protective waxy layer. This mode of action is biocidal, and the materials can be just as damaging to human eyeballs and mucous membranes as they are to weed leaves. So organic herbicides *are* toxic. They can be used safely because we will ensure that no organic herbicide spray will contact anyone and BrightView employees wear eye protection and gloves.

## Organic vs. Natural Organic

The word *organic* is typically used, but what is meant is *natural organic* compounds. Natural organic compounds are materials extracted directly from plants. Natural organic Neem oil is an insect feeding inhibitor extracted from Neem trees.

Organic chemicals and compounds are produced by living organisms. That is the definition. However, chemical manufacturers can make identical compounds. Organic chemicals are characterized by chemical bonds between carbon atoms along with attached hydrogen atoms. This is how enzymes in living organisms produce the molecules of life. The starting materials for gasoline were produced by living organisms. Gasoline is an organic chemical with carbon - carbon bonds created by enzymes in once living organisms. These materials were altered by heat and pressure and turned into crude oil when buried by sediments. Drilling into the earth accesses the buried oil and then it is refined into gasoline and many other *organic* compounds. However, these are not *natural organic* compounds. Another organic example to consider is ascorbic acid, the chemical name for vitamin C. *Natural organic* ascorbic acid can be extracted from fruit; or ascorbic acid can be made in a chemical factory. The vitamin C from the chemical factory is an *organic* chemical, but not a *natural organic* chemical. Both will prevent vitamin C deficiency called scurvy.

## IPM Weed control Strategy

Landscape maintenance in the “built environment” where people live, work, study and recreate usually requires significant “detailing” of the landscape. The landscape needs to look cared for. This includes pruning, trash removal, removing dead flowers, irrigation adjustments and removing most of the weeds by pulling them or cutting with a hoe or weed pick. Many annual weeds are suppressed by 3 - 4 inches of mulch.

Much of the time weeds can be efficiently and effectively reduced to a low level by not disturbing the soil, shading the soil with plants or mulch and allowing the surface layer of the soil to dry out as much as possible. These practices do not require extra labor and can be part of regular landscape maintenance. They are part of “working smarter,” which good landscape management always promotes. When maintenance practices encourage weeds, such as by not using mulch or keeping the soil surface wet, more weeds must be controlled with labor and usually herbicides. It is important to recognize that there is no acceptance threshold for many weeds. One spurge, groundsel, Oxalis, Bermudagrass, Poa weed etc. will soon be many on most irrigated public landscapes. Acceptance threshold is often not useful in the “built environment.” One gopher, rat, mouse or cockroach is unacceptable most of the time to most people.

Note: Gopher control is not provided BrightView. It is important that a Gopher control contractor prevent gopher infestation. Gophers interfere with irrigation, mowing and their soil disturbance supports weed infestation.

## **Schools**

1. Laguna Beach High School, 625 Park Ave. Laguna Beach, CA 92651
2. Thurston Middle School, 2100 Park Ave. Laguna Beach, CA 92651
3. El Morro Elementary School, 8681 North Coast Hwy. Laguna Beach, CA 92651
4. Top of the World Elementary School, 550 Blumont St. Laguna Beach, CA 92651