HEALTHY FOOD SYSTEMS • HEALTHY ENVIRONMENTS • HEALTHY COMMUNITIES • HEALTHY CALIFORNIANS

University of California
Agriculture and Natural Resources
Making a Difference for California

The Green Scene

UC CE

June 2017

Meetings and Announcements

Food Preservation Class—Please respond if interested

Margaret Johns, our Advisor for foods and nutrition presented a class session in our spring Horticulture V class on food preservation and food safety. She has offered to arrange for a more extensive session if there is interest. If you are interested in this topic and would likely attend a class on food preservation, please send me an email (jfkarlik@ucdavis.edu) or call 661 868-6220 and let me know that a.) you are interested, and b.) the meeting time that would work best for you. Several individuals have responded, and I expect Margaret will hold the class, time to be determined.

Fall Horticulture Classes

I expect to offer a Horticulture I class this fall, beginning late August, and also a Horticulture IV class, beginning about the same time. The horticulture classes we offer are not sequential, but rather cover a variety of specific topics. In other words, it's not necessary to have taken Horticulture III to benefit from Horticulture IV. More details later this summer.

Early Announcement--2018 Horticultural Study Tour destination: Thailand

I am in the process of drafting an itinerary for our next (10th) Horticultural Study Tour, this time to Thailand. Our tentative and approximate date frame is Feb 4-14, 2018, since the weather in Thailand then is cool and dry.

Thailand is home to a number of botanic gardens, and a visit would provide exposure to the fascinating culture of Asia. The best definition I have ever seen of sustainable agriculture comes from the demonstration farm at Mae Rim, near Chiang Mai. I would expect that our group would visit Bangkok and Chiang Mai, and we may also arrange a side trip to Angkor Wat in Cambodia. Lodging and other expenses are relatively low in Thailand.

Early Announcement—Chernobyl: April, 2018

We are planning one more trip to the Chernobyl exclusion zone (the Zone). Several people have said they would like to go and did not have an opportunity previously. The time frame for the proposed visit is April 16-20, 2018, and these dates seem firm. We anticipate access to areas not previously visited, and there have been developments in the social and cultural aspects of the Zone as well. Please let me know if you're interested. We already have a list of potential participants.

NITROGEN APPLICATION FOR LANDSCAPE PLANTS

The nutrient elements found in greatest quantity in plants are carbon, hydrogen and oxygen, all of which are obtained from air and water. After these, nitrogen is the nutrient most needed, and has marked effects on plant growth, especially in maintenance of green color and shoot growth rate. In the natural ecosystem, nitrogen is released from decaying organic matter in the form of the ammonium ion (NH_4^+) which is converted to nitrite (NO_2^-) and then to nitrate (NO_3^-) by bacteria. This conversion process is temperature dependent, slow in winter but rapid in summer. Most plants absorb nitrogen in the nitrate form. Because of the negative charge of the nitrate ion, it is not bound to soil particles, which also have negative charges. Nitrogen is easy to add from fertilizer, but nitrate can leach through soil and contaminate ground water. Therefore, it is best to add nitrogen in increments according to plant needs. Most Kern County soils contain little nitrogen reserve because of their low organic matter contents. Compost or other organic materials also contain nitrogen, but at low concentrations of 1-5%, and nitrogen from these is released slowly.

Landscape plants and turfgrasses have varying needs for nitrogen. Plants which grow rapidly, or from which parts are removed through mowing or for harvest, usually have a higher need for nitrogen than do shade trees and shrubs. A useful reference number in horticulture is the general rate of nitrogen application, which is 1 pound of actual nitrogen per 1000 square feet. By using this general rate, the rate of application of common fertilizers can be calculated. The first number on a fertilizer label is percentage nitrogen contained. For example, for ammonium sulfate, 21-0-0 so containing 21% nitrogen, 1 / 0.21 = 4.76, or about 5 lb ammonium sulfate needed to supply 1 lb nitrogen. Therefore, about 5 lb ammonium sulfate per 1000 sq ft would be needed to supply nitrogen at the general rate.

Although fertilizers vary in nitrogen content and the content of other nutrients, a few differences of a few percentage points are usually unimportant. Although fertilizers may be marketed with photos of citrus, tomatoes, watermelon, etc., on the package, the fertilizer materials are often similar from product to product. It is not necessary to buy a different fertilizer for every plant in the landscape! Fertilizers are often more expensive for various conveniences, e.g., forming the product into stakes, making the product very water-soluble, or providing nitrogen in a slow-release form.

For common landscape and garden situations, the following nitrogen (N) rates are suggested:

- For turfgrasses, the N rate can be 1-2 lb actual N/1000 sq ft per growing month. This is a high rate used for intensively maintained turfgrasses. In parks, perhaps no nitrogen is applied. For low maintenance turfs, a single application of N at 1 lb actual N per 1000 sq ft may be made in spring, and an additional application in fall. For home lawns, nitrogen can be applied at 1 lb actual N per 1000 sq ft periodically during the growing season; for example, one application every six – eight weeks, about the time it takes quick-release fertilizers to be consumed.
- For vegetable gardens, nitrogen may be applied pre-plant at 1 lb actual N/1000 sq ft and tilled in, followed by another application during fruiting.
- For trees, a single application of 1-2 actual N per 1000 sq ft beneath the tree crown is usually sufficient, if desired. That application may be split, with around half at bloom time and half a couple of months later. Fruit trees generally need an N application every year; shade trees do not.
- Most landscape plants do not need annual N fertilization when mature. It is usually best to maintain them at a slow growth rate so the landscape does not become overgrown and need premature replacement. When landscapes are newly established, one or two applications of N per year at 1 lb actual per 1000 sq ft may be helpful in bringing the landscape to maturity.

FERTILIZERS AND SOIL ACIDITY

Soils in Kern County are typically alkaline, with pH often 7.3 or greater. While many plants tolerate these pH levels, lowering the pH to near neutral or slightly below can improve performance of many plant species. Iron and zinc, in particular, become more available to plants if soil pH is acidic.

The best time to adjust pH in alkaline soils is before planting when sulfur or gypsum can be incorporated, followed by irrigation. (Gypsum is neutral in soil reaction and is useful in lowering soil pH only when the sodium level is high, not a problem in most soils of most landscapes.)

Many fertilizers react in soil to form acids and can have a limited effect on soil pH. Fertilizers may be advertised as being particularly suitable for "acid-loving" plants. Let us ask the question, is there a standard index for comparison of the acidity of different fertilizers?

The answer is yes, and the standard index for comparison of fertilizer acidity is the calcium carbonate equivalent. This number, often found on a fertilizer label, gives the number of pounds of calcium carbonate (lime) that would be needed to neutralize a ton of the fertilizer in question. The greater the number for calcium carbonate equivalent, the more acid is the fertilizer. In the table below are some fertilizers and their equivalent acidity in pounds calcium carbonate ($CaCO_3$) per ton of fertilizer, as was listed on their respective product labels. Of the fertilizers listed, ammonium sulfate and ammonium nitrate are the most acidic. Note that these two fertilizers are more acidic than some fertilizer products labeled to suggest extra acidity.

Fertilizer Material	**Equivalent Acidity (lbs. $CaCO_3$ per ton)**
ammonium nitrate 33-0-0	1240
ammonium sulfate 21-0-0	2200
urea 46-0-0	1420
single superphosphate 0-20-0	neutral
triple superphosphate 0-46-0	neutral
potassium sulfate 0-0-52	neutral
Vigoro Citrus & Avacado 10-4-8	500
Vigoro Azalea, Camelia, Rhododendron Food 4-10-10	200
Vigoro Vegetable Food 5-10-10	300
Vigoro All Purpose 6-10-4	400
Ross Evergreen 10-20-20	400
Ross Fruit, Nut, Tomato 9-45-16	900
Ross Tree & Shrub 25-10-10	700
Miracle Gro Tomato 18-18-21	500
Miracle Gro Roses 18-24-16	700
Stern's Miracid 30-10-10	1200
Best Soil Buster 2-5-0	230
Sulfur (included for comparison)	4620

How much of an effect will fertilizers have on soil pH? In most landscape situations, fertilizer has little effect on pH because relatively small quantities are applied and the calcium carbonate equivalent of many fertilizer products is low. Fertilizers are not agents of major short-term pH change, but continued use of high rates of fertilizers with high calcium carbonate equivalents can lower soil pH, as seen in some agricultural fields.

John Karlik
Environmental Horticulture/Environmental Science

Disclaimer: Discussion of research findings necessitates using trade names. This does not constitute product endorsement, nor does it suggest products not listed would not be suitable for use. Some research results included involve use of chemicals which are currently registered for use, or may involve use which would be considered out of label. These results are reported but are not a recommendation from the University of California for use. Consult the label and use it as the basis of all recommendations.

The University of California, Division of Agriculture and Natural Resources (UC ANR) prohibits discrimination against or harassment of any person in any of its programs or activities on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, status as a protected veteran or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994 [USERRA]), as well as state military and naval service. UC ANR policy prohibits retaliation against any employee or person in any of its programs or activities for bringing a complaint of discrimination or harassment. UC ANR policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment, or participates in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to any of its programs or activities. UC ANR is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment and/or participation in any of its programs or activities without regard to race, color, religion, sex, national origin, disability, age or protected veteran status. University policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's equal employment opportunity policies may be directed to: John I. Sims, Affirmative Action Compliance Officer and Title IX Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397. Email:jsims@ucanr.edu. Website: http://ucanr.edu/sites/anrstaff/Diversity/Affirmative_Action/.