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

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The Green Scene

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WELCOME TO TEHACHAPI READERS

I'd like to welcome readers from Tehachapi and especially those participating in our night class there on horticulture for landscapes, orchards, and gardens. Several of the articles in this newsletter are in response to your questions.

WOOD ASHES FOR THE GARDEN

Wood ashes from fireplaces or stoves may accumulate in winter. There are several potential benefits of adding wood ashes to soil, first in their potassium content. Potassium, or potash, is necessary for the healthy growth of fruits and vegetables. After nitrogen, it is the nutrient used in greatest quantity in plants, and wood ashes contain about 5 to 7 percent potassium. Ashes from hardwoods contain more potassium than those from soft woods. Wood ashes also contain about 1½ percent phosphorus, also a necessary nutrient. To preserve nutrient content, ashes should not be stored where rain will leach out nutrients. Ashes may be spread at a rate of 5 to 10 pounds per 100 square feet of soil followed by incorporation. The minerals contained dissolve easily so ashes should not be used close to seedlings to prevent fertilizer burn.

However, there are several potential disadvantages of using wood ashes as a fertilizer. Many Kern County soils are already high in potassium, and further additions may not be beneficial. Unlike many soil amendments and fertilizers, ashes are strongly alkaline in reaction. Soils in Kern tend to be too alkaline already, and wood ashes further increase pH.

The free one-sheet publication "Wood Ashes as a Garden Fertilizer" is available from the Cooperative Extension Office, 1031 South Mt. Vernon Avenue, Bakersfield, CA 93307.

WEED-AND-FEED-PRODUCTS FOR TURFGRASS

Several combination products containing fertilizer plus herbicide are available for turfgrass. Combination products may be divided into two categories: those containing fertilizer and a pre-emergent herbicide, and those containing fertilizer and a post-emergent herbicide. A difficulty in using weed-and-feed products in Kern County is the appropriate times for fertilizer and herbicide applications are often not the same.

The predominant spring weed problem in most turf areas is crabgrass, an annual weed against which certain pre-emergent herbicides are effective if applied before seed germination. On the Valley floor, the herbicide should be applied by the first week of February. Fertilizer applied in late January can benefit cool-season turf such as tall fescue or overseeded grasses such as rye, but provides no immediate benefit for dormant warm season grasses such as bermudagrass. Waiting to apply a pre-emergent herbicide and fertilizer combination until warm-season grasses emerge from dormancy assures that the herbicide will be applied too late to be effective.

The timings for post-emergent herbicide application and fertilizer application can align. However, granular weed-and-feed products containing post-emergent herbicides may not be as effective against

broadleaf weeds as would a liquid foliar herbicide application, because granules may bounce off leaves. Also, since fertilizer and herbicide products are broadcast over the entire turf area, the herbicide may be applied where it is not needed. Spot treatments for weeds are preferred from an IPM vantage point. (Usually if a turf area contains more than 40% weed cover, I suggest eradication of both weeds and turf and replanting.)

Although weed-and-feed products have a place in some turf management systems, separate applications of fertilizer materials and herbicides afford greater flexibility in timing and selection of both fertilizers and herbicide compounds.

EARWIGS AROUND THE HOME AND GARDEN

David Haviland, Entomology Farm Advisor, Kern County

European earwigs, often called pincherbugs, are some of the most readily recognized insects around home gardens and landscapes. They can also be one of the most frustrating to control. Larger-than-normal earwig populations that began last fall have become more than just a nuisance for many home gardeners. Earwigs have also irritated many homeowners who repeatedly find them indoors.

Despite many myths, earwigs are not aggressive and rarely pinch. Pinching is a defense mechanism that is only used when the earwigs are provoked. Another myth is that earwigs cannot fly. This is also false. Earwigs are very good fliers and are often attracted to lights at night. They only have one generation per year, and are most active and noticeable during the spring and fall. During the winter and summer they primarily go unnoticed down in the soil.

Earwigs are generally considered beneficial due to their predation on small organisms like aphids and mites. However, they can also damage plants by feeding on newly developing tissues. This damage is most pronounced in young plants in the cotyledon stage or on plants with only a few true leaves, plants that are too small to be able to compensate for the losses. For example, new bean and bell pepper plants can be killed or severely stunted when earwigs chew holes in the leaves or kill the growth terminal. The same is true for annual flowering plants emerging from seed or recently transplanted into a landscape. As annual plants mature, however, this damage becomes much less significant; mature landscape plants or perennial shrubs are relatively unaffected.

The first line of defense against earwigs is to remove environmental conditions that favor them. This includes areas that are cool and moist with lots of organic plant matter, such as layers of leaf litter under shrubs and trees that are frequently rewetted by landscape irrigation. These conditions were difficult to remove this spring due to the prolonged rainy season, but will be easier to obtain as the weather becomes hotter and dryer.

Hotter, dryer weather is also the optimal time to use trapping as an earwig removal strategy. This is accomplished by putting wet rolls of newspaper or corrugated cardboard in areas known to have earwigs. After feeding at night the earwigs hide inside the newspaper or cardboard and can be collected and discarded during the day. One easy disposal method is to drown the collected earwigs by shaking the newspaper or cardboard over a bucket of water with a small amount of dish soap. Another method is to shake them out onto a hard surface and introduce them to the bottom of a shoe.

If habitat management and trapping are not sufficient, chemical insecticides can be of use. Insecticides containing the chemical carbaryl (Sevin®) can be used on a wide range of plants and will kill some earwigs and deter others. Other broad spectrum insecticides, such as those used in home perimeter treatments can also be effective if they come in direct contact with the earwigs. Be careful, however, to read and strictly follow all label instructions and restrictions prior to their use in order to ensure the safety of people, pets, and the environment.

Additional information on the biology and management of earwigs is available at the University of California Integrated Pest Management web site (http://www.ipm.ucdavis.edu) by clicking on the first link for Pest Notes and then by clicking the link for Earwigs.

BIOLOGY AND MANAGEMENT OF THE EUROPEAN BROWN SNAIL IN KERN COUNTY

The European brown garden snail is an important pest in certain commercial agricultural crops, especially citrus, and in landscape settings in California. Cold, wet conditions favor snail development. The classic work by Basinger (1931) forms a basis for understanding snail biology and management.

Biology of the European Brown Garden Snail

The European brown garden snail, *Helix aspersa,* was first described by Müller in 1974. It is of the family Helicidae, of the order Pulmonata, which encompasses the terrestrial air-breathing mollusks. In 1850, the snail was identified in Santa Barbara, the earliest record of its presence in California. The snail was deliberately introduced by A. Delmas, probably as an item for consumption as food (Basinger, 1931).

The European brown garden snail feeds on a variety of plant material. Citrus is the agricultural crop most affected, and snails feed upon leaves, fruit and twigs. Several landscape plants are commonly affected especially Kaffir Lily, *Clivia miniata,* and home vegetable garden plants such as lettuce. The snail has a chitinous jaw, attached to muscles, and a radula (tongue) which is used to scrape food particles into the mouth. The coordination of radula and jaw enables the snail to obtain a fairly good grip on vegetable material (Basinger, 1931).

Oviposition takes place when temperature, humidity and soil conditions are favorable, as frequently as once per month when warm, damp weather occurs. Cold or hot conditions, or dry soil, inhibit oviposition. Egg masses varied from 33-119 with an average of 86 in studies conducted in the 1920's. eggs usually hatch in about two weeks, and the young feed upon the first suitable tender plants they encounter (Basinger, 1931).

Management

Management options exist based on integrated pest management (IPM) strategies, including both non-chemical and chemical methods. Non-chemical methods are mostly about reducing surface moisture and cover. Chemical methods include introduction of malt beverage or molluscicides.

Non-Chemical Methods

Predators may be introduced, principally the decollate snail, *Rumina decollata,* or avian species such as ducks. Decollate snails have a spiral- or cone-shaped shell. These snails are effective predators of the European brown garden snail. Although decollate snails can feed on small seedlings, the benefit they provide outweighs their limited feeding on plants.

Reducing relative humidity and surface moisture in the feeding area creates unfavorable environmental conditions for snails. Removing surface debris deprives snails of refuge, allowing greater exposure to predators and increasing the chance of desiccation. Trapping techniques, when combined with manual removal of snails, are effective in reducing the population, but must be practiced consistently to achieve a sufficient level of control. Once the population is reduced, exclusion can prevent recurrence of the pest. A large Los Angeles wholesale nursery has been successful for more than a decade in preventing snails from reentering the production area from surrounding residential landscapes.

Various barriers have been promoted but vary in effectiveness. Anecdotal evidence suggests that coarse materials are marginally effective under dry conditions, but effectiveness decreases rapidly when barriers are wet. Of barrier materials, copper has proven performance and copper strips have been used successfully in commercial citrus. The mode of action of copper is not completely understood but an electrochemical reaction is suspected.

Chemical Methods

Several chemicals, applied as baits, have given control of snails. A series of experiments by Cranshaw (1988) showed that beer was effective when introduced to slug-infested landscape. Fresh beer was more effective than flat, although no data for comparison was presented. Brand comparison indicated that Kingsbury Malt, Michelob and Budweiser (not BudLight), respectively, were most effective. Beer does not

carry an EPA registration number; therefore, use of beer as a pesticide in commercial agriculture or landscaping in California is illegal.

Metaldehyde, LD_{50} 630 (rat), is an attractant, and causes an increase in secretion of slime and eventual death by desiccation. Metaldehyde is obtained from polymerization of acetaldehyde (ethanal) in the presence of ethanol. The monomer, acetaldehyde, and trimer, paraldehyde, are not effective. Only the compound containing four acetaldehyde units is effective, but the precise mode of action has not been determined. Metaldehyde is most effective during warm, dry weather. Methiocarb, LD_{50} 100-130 (rat), is a carbamate class pesticide, which presumably acts to interfere with nerve impulse transmission, the typical mode of action of carbamates (Cremlyn, 1991). These baits are sold under various trade names. Baits are also toxic to decollate snails, and may be attractive to pets and children. Consequently, label directions must be followed explicitly and use of bait stations is recommended. Site and moisture conditions are determinants of bait selection.

Recently, another bait has been introduced that has much improved environmental characteristics and very low toxicity to pets and wildlife. Iron phosphate is the active ingredient, which is an inorganic compound composed of iron, phosphorus and oxygen. It is sold in pellets that include a bait attractant. In tests in the Ventura area it has been found to be very effective.

References

Cremlyn, R.J. 1991. *Agrochemicals: Preparation and Mode of Action.* John Wiley and Sons, Ltd., 396 pp.

Basinger, A.J. 1931. *The European Brown Snail in California.* Bulletin 515, Agricultural Experiment Station, Berkeley, CA, University of California Printing Office, 22 pp.

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Environmental Horticulture/Environmental Science