

Contra Costa County Agriculture and Weights & Measures Newsletter



Summer 2012

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This is a part of a series of quarterly newsletters designed to inform growers in Contra Costa County about issues important to the Agricultural community. We welcome your questions and comments about any topics in this newsletter as well as suggestions for future newsletters. Contact us at:

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Pesticide Spray Additives

How well a pesticide works will often depend on how well it was applied. Problems such as poor pesticide adherence, incompatibility, foaming, drift, evaporation, degradation, solubility, etc. can hurt pesticide spray efficiency. The right tank additives can help reduce or even eliminate application problems. Additives are not always needed. Many pesticides already include any necessary additives in their formulation.

Always use additives that are correct for the specific pesticide. The wrong additive can react with a pesticide by binding with it, breaking it down, changing its action, etc. The wrong additive can even cause damage to the crop. For example; when an oil based additive is used with wettable sulfur, it can damage plants.

It is important to use additives that have been specifically formulated for use with pesticides. Industrial and household chemicals can interfere

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Spray additives can help pesticides penetrate more efficiently into the target pest.

with a pesticide's performance. Dish soap is not designed for use with pesticides and can burn new growth.

There are thousands of pesticide spray additive products available for sale. With so many to choose from, it can be hard to select the proper one to use. A good place to start is to look on the pesticide label for recommendations about additives to use and warnings about ones to avoid. Read both the pesticide and additive labels carefully to make sure they will work for the intended site, target pest, equipment, and pesticide. Licensed Pest Control Advisors and U.C. Cooperative Extension Farm Advisors can also recommend additives to use. If you have questions about the properties of an additive or pesticide, your pesticide dealer and/or the chemical's manufacturer can provide technical information, Material Safety Data Sheets, and any available supplemental product labeling.

Many spray additives are legally defined as pesticides by the State of California so their use must be reported on monthly pesticide use reports. To determine if an additive is a pesticide, look on the product label. If it has an EPA or California State registration number, its use must be reported.

It is common for users to assume that pesticide spray additives are non-toxic, but this is not true. Some additives are far more hazardous than the



The use of a foam marker can help ensure proper field coverage during an application.

pesticides they are used with. There are almost 40 "Danger" labeled agricultural use additives currently registered in California. Most "Danger" additives are corrosive and can cause irreversible eye and skin damage. For this reason, it is important to always wear the required personal protective equipment listed on both the pesticide and additive labels.

Adjuvants are a specific category of pesticide spray additives. An adjuvant is defined as a substance added to a pesticide that improves the performance of the pesticide. The use of adjuvants can alter the physical characteristics of the spray solution, help the pesticide reach the target, and compensate for marginal conditions.

Other types of additives may be used to help the applicator target the pesticide spray more precisely or to reduce problems associated with the application. Dyes, colorants, and markers show where sprays have been applied, help ensure proper coverage, and detect spray drift. Odor masking agents can cover the scent of strong smelling pesticides and help reduce complaints from neighbors and the public. These types of additives are not considered to be pesticides.

On the following page, there is a table showing seven common spray problems and the types of additives that can help reduce them.

Octylphenoxypolyethoxyethanol	33.0%
Monocarbamide dihydrogensulfate	20.4%
Constituents ineffective as adjuvants	46.6%
Total:	100.00%
CA Reg. No. 11656-50093	
EPA Establishment No. 11656-CA-002	

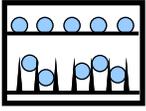
PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS & DOMESTIC ANIMALS

DANGER

Corrosive - causes irreversible eye damage. Do not get in eyes or on skin or on clothing. May cause skin irritation. Avoid contact with spray. Avoid breathing spray mist.

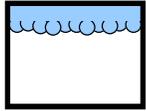
Many spray additives are legally defined as pesticides. Some are also extremely toxic.

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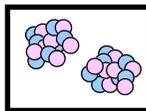
Problem: spray droplets bead up on waxy or hairy leaf surfaces. Droplets run off or evaporate without penetrating the leaf or insect's skin.

Solution: Surfactants (also called spreaders or wetting agents) reduce the surface tension of spray droplets and allow them to spread out evenly over the leaf or insect surface. Stickers (also called extenders) cause the pesticide to stick to the leaf and resist being washed off. Surfactants are classified by the way they ionize: positive (cationic), negative (anionic), or none (non-ionic). It is important to select the correct type to match the pesticide being used. Surfactants and stickers are usually combined and are the most commonly sold spray additive products.



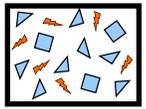
Problem: Oil based pesticides resist being suspended in water and tend to collect in a layer on top of the water in the tank.

Solution: Emulsifiers break up the pesticide into smaller droplets that can more easily stay dispersed throughout the tank. Emulsifiers are used with tank agitation to keep pesticide mixtures in solution and help ensure that the application rate remains constant.



Problem: Chemicals react with each other to form clumps and/or uneven distribution in the tank. Incompatible mixtures can ruin sprayers by blocking pumps and distribution lines. As an example, 2,4-D and copper sulfate produce a gelatinous mixture when combined.

Solution: Compatibility agents help chemicals blend uniformly in the tank. Always read label directions carefully to check for incompatible mixtures. It is a good idea to first test a mixture of the pesticides plus the compatibility agent in a quart jar to check for clumping, separation, thickening, or heat release. Be sure to wear the safety equipment required by the labels when doing a jar test.



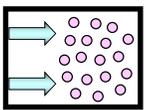
Problem: High pH in the water used for tank dilution causes pesticides to break down.

Solution: Buffers and acidifiers correct the pH of the tank mixture and bring it to levels where the pesticide will be most effective (generally between pH 5.5 to 7.0). Buffers stabilize the pH of the tank mixture to stay within a relatively constant range. Acidifiers lower the pH but don't stabilize it. Some pesticides are far more sensitive to pH than others. Be sure to check the pesticide label to find out the recommended pH levels.



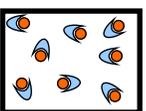
Problem: excessive foam or froth is produced when certain chemical mixtures are agitated in the spray tank. Paraquat is an example of a pesticide that produces foam.

Solution: Defoaming agents reduce or eliminate foam by lowering the surface tension of the spray to prevent bubbles from forming.



Problem: Small spray droplets are blown by wind onto non-target, sensitive sites.

Solution: Drift retardants, deposition aids, and thickeners reduce the production of small droplets. Larger droplets are less likely to be carried away by wind than smaller, lighter ones. Thickeners may also slow evaporation so the spray has more time to work.



Problem: calcium, magnesium, and iron in hard water can react with pesticides, reducing their effectiveness. They may also reduce spray solubility and penetration. Some pesticides, such as glyphosate, are especially sensitive to water with a high mineral content.

Solution: Water conditioners improve pesticide performance by combining with the minerals in hard water and preventing them from binding with the pesticide.

Honey Bee Parasitic Fly

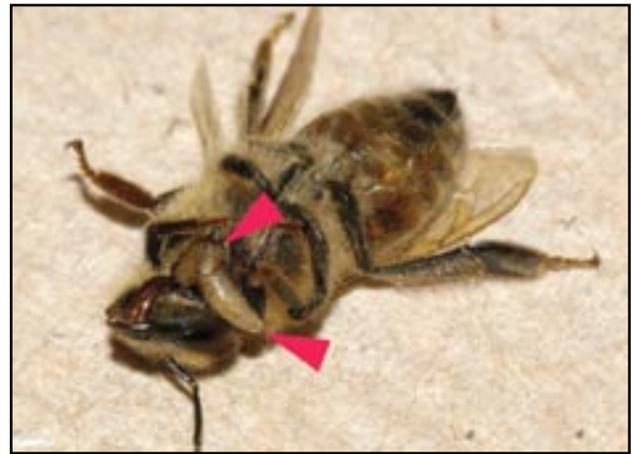
Since 2006, many beekeepers in the United States have suffered the sudden mysterious losses of bees in their hives. This syndrome, called Colony Collapse Disorder (CCD), is a potential threat to both agriculture and the environment. Pollination by honey bees is vital for the production of many types of crops. Beekeeping adds more than \$15 billion in economic value to agriculture annually. Native plants, which evolved to be pollinated by native insects, often need European honey bees as a substitute when native insect populations decline due to habitat loss, etc.

A recent study by researchers from San Francisco State University may help shed light on the cause of CCD. They discovered that *Apocephalus borealis*, a North American native phorid fly that parasitizes bumblebees and paper wasps, will also attack honey bees. Researchers believe that it has only recently expanded its host range to include European honey bees. It is widespread in the San Francisco Bay area and was found infecting worker bees at 77% of the sites that were sampled.

The Phoridae are a large, common, and very diverse family of flies. They generally look like small, hump-backed fruit flies. Different species of phorid flies can be scavengers, herbivores, predators, or parasites. Some parasitic phorid flies feed on spiders, millipedes, termites and



Apocephalus borealis attacking a bee.



A. borealis maggot emerging from a bee.

other insect species. One species is even being grown and released in many southeastern states to help control Red Imported Fire Ant.

Worker bees infected by *A. borealis* were found to leave their hives at night and gather near lights. This happened even on cold, rainy nights when honey bees would not normally be active. Infected bees walked in circles, appeared disoriented, had difficulty standing, remained inactive the next day, and died soon afterwards.

To make matters worse, *A. borealis* also carries diseases that affect honey bees. The researchers found that it tested positive for deformed wing virus and *Nosema ceranae* (a microbial parasite). It may be able to vector other pathogens not only between honey bees but also between honey bees and native bees.

Many parasitic species, including phorid flies, alter the behavior of the hosts they attack. It is possible *A. borealis* manipulates the bees' normal behavior. However, it is equally possible the bees leave the colony because of an instinct to protect it from infection or because they were ejected by other bees who detected their illness.

The symptoms of *A. borealis* infection on honey bees may help explain CCD. The abandonment

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Moving infected hives across country could spread *A. borealis*.

of the hive at night by worker bees is consistent with the sudden disappearances found with CCD. The researchers also found that the level of infection peaked in late summer to fall. Reports of CCD in the area also seemed to peak during or just after the peaks in *A. borealis* parasitism.

Native phorid flies in South and Central America, do parasitize honey bees there. However, beekeepers in the United States have not had problems with native parasitic insects until recently. *A. borealis* is likely to become a major problem in this country.

There are a number of factors that favor an *A. borealis* population explosion. It can multiply rapidly, producing up to 13 larvae per bee, with several generations per year. Unlike native bees, honey bees live close together in large numbers and infections within a hive spread quickly. Hives are usually located close together in agricultural areas, allowing infections to cross between them. Commercial beekeepers who sell the services of their bees for pollination, often ship hives across the country, potentially spreading *A. borealis* along the way.

A. borealis has already been reported in thirteen states across North America as well as in Canada. It could easily be spread to other countries through the movement of infected queens and hives. As *A. borealis* spreads, it could hurt agriculture and the environment world wide.

Drought Declaration

Much of the crop and rangeland areas in Contra Costa County received less than one half inch of rain from late November through mid January. This period, in which a large proportion of the season's rain would normally fall, is critical for the growth of winter grain, rangeland pasture, and other non-irrigated crops.

When significant rainfall arrived in March, it was already too late for many crops to recover and catch up to normal growth. By the end of the winter rain season, there was an estimated 55% loss to dryland hay/grain crops, 76% loss to rangeland pasture, and 35% loss to non-irrigated barley grain crops in Contra Costa County. To help affected growers, the Contra Costa County Department of Agriculture has asked the USDA to declare the county as a natural disaster area.

When USDA issues the declaration, all qualified farm operators within the designated areas will become eligible for low interest emergency loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Growers will have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. The maximum loan amount is \$500,000. To get a loan application, call the Stockton USDA service center office at (209) 472-7127.



The 2011-2012 winter drought has severely damaged Contra Costa County rangeland and winter non-irrigated field crops.

A Consumer's Guide to Firewood

Many people choose to buy firewood for the winter to use in their wood-burning stoves or fireplaces. If you're considering purchasing firewood for the upcoming season, here are a few things to remember.

It is important to always be aware of fire hazard. When firewood is burned, deposits of creosote form inside stovepipes and chimneys. Creosote, a highly flammable black tar, can form layers up to several inches thick and is a common cause of structural fires. Anyone who burns firewood should have their stovepipes and chimneys inspected regularly. Sparking can also be a fire hazard. Certain tree species contain pockets of moisture or resin which explode when heated. These "pops" throw sparks which could start a fire if they fell onto flammable materials.

Green wood produces less heat and forms more creosote when it is burned due to its high moisture content. Seasoned dry wood is better because it burns more efficiently and cleanly. Before use, firewood is typically cut, split, and stacked until its moisture content has been reduced. To distinguish seasoned dry wood from green wood, look for cracks in the end grains, bark that comes off easily, and wood that makes a hollow sound when two pieces are knocked together.

Not all firewood is the same. Wood from different tree species can vary in the level of heat generated, ease of starting, amount of sparking, smoke produced, ease of splitting, and the quantity of creosote produced. Hardwoods



Seasoned dry firewood usually has cracks.



Firewood in California may be sold only by the cord or cubic foot.

(deciduous trees) are generally denser and produce up to twice as much heat as softwoods (evergreen trees). Hardwoods also tend to form less creosote than softwoods. Where the firewood was grown can also be important. Firewood can carry invasive insects and diseases that are dangerous to native trees. Even if the firewood has no visible signs of insects or disease, there still may be tiny insect eggs, grubs, bacteria, and fungal spores on or inside it. Buying local firewood is safer for the environment and helps our local economy. Firewood prices can vary widely, so it's best to shop around, order well before the winter season, and buy in bulk.

In California, firewood is sold by a measurement called a "cord." To measure a cord of firewood, stack the wood neatly by placing it in a line or a row, with individual pieces touching and parallel to each other, making sure that the wood is compact and has as few gaps as possible. To be a cord, the width of the stack times its height times its length must equal 128 cubic feet.

A cord, like other measurements such as a foot, gallon, or ton, is defined by law. In California, firewood may not be sold by the "truckload," "face cord," "rack," or "pile". These terms have no legally defined meaning and a consumer who bought them would have no way to be sure just how much firewood they had purchased. Wood

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Firewood sellers may not use measurements such as “truckload”, “pile”, or “rack”.

can only be sold by the cord or by fractions of a cord for amounts of 1/8 cord or more. If the quantity of firewood is less than 1/8 cord, the wood must be sold by the cubic foot or by fractions of a cubic foot.

When you buy firewood, it is best to deal with reputable businesses. Make sure to get a sales invoice or delivery ticket which shows the name and address of the seller, the date purchased or delivered, the quantity purchased, and the price of the quantity purchased. It also helps to have the seller’s phone number, what kind of wood was purchased, and the license plate number of the delivery vehicle. Before paying, especially when paying cash, be sure to confirm the quantity of wood received.

When the wood is delivered, ask the seller to stack it (there may be a charge for this service) or stack the wood yourself. Measure the wood before using any of it. If the measurement indicates that you did not receive the correct amount, contact the seller. If the seller can’t or won’t correct the problem, contact your local weights and measures office before you use any of the wood. It is also helpful to take pictures of the stacked wood in order to document the shortage.

If you feel you have been overcharged by a firewood seller, report it to your County Weights & Measures Department. All consumer complaints will be investigated.

Contra Costa County Yesterdays

Grape phylloxera, an aphid-like insect, devastated vineyards in both Europe and California in the 1850’s. It feeds on the roots of grapevines and is native to the eastern United States. Grape phylloxera was introduced on infested American native grape nursery stock. It destroyed over two-thirds of European vineyards and severely damaged vineyards in California.

According to the 1921 USDA Bulletin of Agriculture, grape phylloxera came to Sonoma county before 1875 and soon spread to Napa and Solano counties. It reached Contra Costa and Alameda counties sometime between 1880 and 1890. Some of the earliest quarantine laws in California were passed in an attempt to prevent the spread of grape phylloxera.

Since American native grapes were resistant to grape phylloxera, European wine grapes grafted onto American grape rootstock could survive in infested areas. Growers in both Europe and California were forced to remove entire mature vineyards and replace them with grafted vines.



courtesy Contra Costa County Historical Society

Vineyards infested with grape phylloxera had to be replaced with grafted vines.

Grape phylloxera is able to reach roots through cracks in drying soil. Vines planted in sandy soils can resist infestation while those in loamy or clay soils are attacked. Contra Costa County has vineyards that are over 100 years old planted in the sandy soils in east county. Grape phylloxera is present in California today and is still controlled mostly through the use of resistant rootstocks.



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