Using Pesticides Safely in and around the Southern Home[1]

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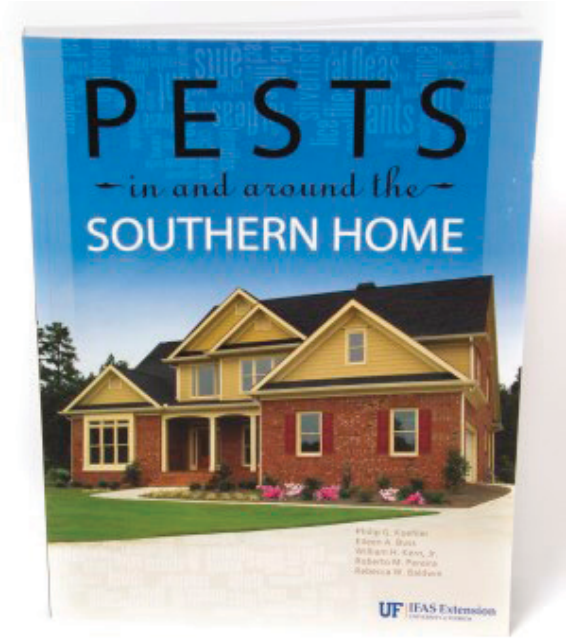

Figure 1. This fact sheet is excerpted from SP486: Pests in and around the Southern Home, which is available from the UF/IFAS Extension Bookstore. http://ifasbooks.ifas.ufl.edu/p-1222-pests-in-and-around-the-southern-home.aspx

When applying any pesticide, you assume the legal responsibility for using it strictly in accordance with label instructions. You must always protect people who live or work in the treated area so they are not exposed to harmful residues. Avoid using pesticides or application methods that might injure nontarget animals or plants or damage property. Pesticide use should not endanger the environment or cause contamination of groundwater, soil, air, or human and animal foods. In addition, you must use pesticides in ways that avoid excessive exposure to any part of your own body. Precautions that must be observed when handling pesticide containers, including guidelines for mixing pesticides, as well as some of the steps that must be taken to properly apply pesticides, ways to safely store these materials, and information on pesticide disposal are summarized.

Liquids

Pesticide liquids are mixtures of powdered or liquid active ingredients combined with liquid carriers such as water or petroleum products. Pesticides may dissolve in the carrier to form a solution or may remain suspended in the liquid to form an emulsion or suspension. Suspensions and emulsions require constant agitation to maintain a uniform spray mixture.

Liquid pesticides are applied as spot treatments, crack and crevice treatments, fogs or mists in confined areas, or general sprays to large areas. The common ways to apply liquid sprays are with aerosol dispensers, hand-held compressed air sprayers, backpack sprayers, or larger, motorized spray units.

When liquid sprays are applied, a residue of pesticide active ingredient remains on the treated surfaces and helps

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to control pests over a period of time. The length of time depends on the type of pesticide used, the type of formulation, the concentration of active ingredient applied, the type of surface treated, and environmental influences such as temperature, humidity, or sunlight.

Undiluted pesticides contain concentrated amounts of active ingredient that may cause serious injury if inhaled, splashed or blown into the eyes, or spilled on the skin or clothing. Some concentrated pesticides may be flammable.

Applying liquid sprays in certain areas may be extremely hazardous. For example, electrical outlets, motors, or exposed wiring pose a potential threat of electrical shock to persons applying water-based pesticide sprays. Pilot lights and gas flames from heaters and appliances may ignite flammable petroleum-based pesticides. Sparks from electric motors and switches and glowing heating elements may also ignite flammable materials. Pesticide vapors or fumes in confined areas may injure people if ventilation is inadequate.

Gases

Gases that kill pests are known as fumigants. Fumigants are used to control certain stored-product insects, drywood termites, wood-destroying beetles, soil-infesting nematodes, soil pathogens, and some rodents. The process of applying fumigants, or fumigation, is much different from other forms of pesticide application and requires application by a professional pest control operator.

Dusts

Dust formulations are finely ground dry powders that contain toxic materials. These are sometimes used to control certain insects. Most dusts are blown into inaccessible places where pests hide. Dusts do not penetrate surfaces, and they usually break down slowly. Therefore, the active ingredient in dust formulations remains on the treated surface and is active against pests for a long period of time if the treat area stays dry. Because they do not penetrate, dusts are more effective than liquids on absorptive surfaces such as concrete.

Dusts may be applied in cracks and crevices, under cabinets or appliances, and in other areas inaccessible to children and pets. This formulation leaves visible residues on treated surfaces, which often limits its use to areas such as warehouses, attics, crawl spaces, and wall voids.

Dusts usually provide better coverage than sprays in inaccessible or hard-to-reach places. In wall voids, they can be dispersed with compressed air to better reach all surfaces. During manufacture, dusts are sometimes given an electrical charge or they are combined with an electrically charged powder to make them cling to surfaces better. Bulb applicators, shaker cans, aerosol cans, and compressed air dusters are used to apply dust formulations.

When using dusts, prevent their drift into the airspace of rooms or work areas. Apply dusts only according to the instructions on the pesticide label. Wear approved respiratory protection to avoid inhaling dust particles.

Desiccants are dusts or sorptive powders used to control certain insect pests found in buildings. The powder abrades or adsorbs the waxy coating that protects insects from losing body water. Desiccants often last longer than other forms of insecticides. However, insects must move through the material or dust and pick some up on their bodies for it to be effective. Desiccants should be blown into wall voids, attics, crawl spaces, and other areas where insects hide. Some desiccants are repelling, which helps keep insects from treated areas. Avoid breathing dusts during application by wearing respiratory protection.

Granules

Granular formulations are sometimes used to control ants, sowbugs, earwigs, snails, slugs, and occasionally other soil-inhabiting organisms. Usually granules are combined with a food substance or attractant to encourage target pests to feed on them. Do not apply granules in areas where children or pets may come in contact with them.

Toxic Bait

Toxic bait may be used to control specific types of insects. Most baits are a combination of a pesticide and a food material. Baits are usually placed in a bait station or broadcast over the soil around the outside of a structure.

Choose bait types and bait station styles on the basis of (1) the type of pest being controlled, (2) the past history of bait use, and (3) the conditions where baiting will take place. For example, when baiting for ants, select a bait that foraging workers will carry back to the nest to feed to the colony's reproductives and brood; the toxic substance must be slow-acting so that foraging workers are not killed before they reach the nest. Bait used to control flies, on the other hand, must be fast-acting in order to stop continued annoyance and prevent further egg laying.

Place or apply insect baits in areas of greatest activity or in areas that cannot be sprayed or dusted. To treat ants,

place the bait along trails, near nest entrances, around the foundation of the building, and under sinks and other out-of-the-way locations inside the building. Apply cockroach bait under appliances, under sinks, behind furniture, and in hidden areas where these insects have been observed or are suspected to occur. Place bait at wall intersections, as cockroaches tend to travel along edges. For cockroach species that occur outdoors, place baits in or around woodpiles, in water meter boxes, and in other protected locations where these insects are usually found.

How Pesticides Can Injure People

Poisonous chemicals such as pesticides injure or kill people by interfering with the normal functioning of internal body organs and systems. The nature and extent of injury depends on the toxicity of the chemical as well as the dose (amount of material) that enters the body. A person's health and size may also influence the severity of injury.

The ingredients of some pesticides are very potent and are capable of causing poisoning at doses as small as a few drops. Other less-toxic pesticides might require as much as several pounds be consumed before signs of illness appear. Regardless of the specific potential hazard, anyone working with pesticides should avoid exposure by using suitable protective clothing and application techniques. Anyone living or working in pesticide-treated areas must also be protected from exposure levels that will result in injury.

Poisoning Symptoms

Symptoms are abnormal conditions, feelings, or signs that indicate the presence of an injury, disease, or disorder. When a person is exposed to a large enough dose of pesticide to cause injury or poisoning, some type of symptoms will usually appear. These symptoms may show up immediately or after several days; sometimes they may not appear until after several months or years. It may be difficult to associate the illness or injury with its cause if there has been a lapse of time between exposure and observable effect.

The effect of an exposure can be localized, such as eye or skin irritation, or generalized, where the pesticide is absorbed into the blood and distributed to other parts of the body. A pesticide can affect several different internal systems at the same time. If the person experiences an injury but recovers quickly, or gets worse and dies within a short time, it is known as an acute illness or injury. If the resulting effects last for a long time, and perhaps are irreversible, it is known as chronic. Examples of chronic conditions usually associated with high or prolonged levels of exposure to certain pesticides include, among others, infertility, birth defects, and cancer. Pesticides that are found to cause such disorders or are suspected of causing these problems may lose their federal registration and can then no longer be used in the United States.

Some pesticide poisoning symptoms are similar to symptoms produced by many other chemicals or conditions. The type of symptoms may vary between chemical classes of pesticides and may also be different among pesticides within the same chemical class. The presence and severity of symptoms usually are proportional to the amount of pesticide (the dosage) entering the tissues of the exposed person. Symptoms may include a skin rash, headache, or irritation of the eyes, nose, or throat. These symptoms disappear within a short period of time and sometimes are difficult to distinguish from symptoms associated with an allergy, cold, or the flu.

Other symptoms that might be caused by higher levels of pesticide exposure include any of the following: blurred vision, dizziness, heavy sweating, weakness, nausea, stomach pain, vomiting, diarrhea, extreme thirst, and blistered skin. Poisoning can also result in apprehension, restlessness, anxiety, unusual behavior, shaking, convulsions, or unconsciousness of the victim.

Although these symptoms can indicate pesticide poisoning, they also may be signs of other physical disorders or diseases. Whenever the possibility of poisoning exists, consult a physician, and be sure to have readily available a copy of the pesticide label or the name of the pesticide, the manufacturer, and the EPA registration number. Diagnosis of a pesticide-related injury usually requires careful medical examinations, laboratory tests, observation, and familiarity with a person's medical history.

Individuals commonly vary in their sensitivity to pesticides. Some people show no reaction to a dose that can cause severe illness in others. A person's age and body size may influence their response to a given dose; thus, infants and young children are normally affected by smaller doses than adults. Also, adult women may be affected by smaller doses of some pesticides than adult men. The unborn child carried by a pregnant woman may be highly sensitive to exposure to some pesticides by the prospective mother.

Pesticides that are applied in strict accordance with their label instructions and with adherence to application rates, reentry intervals, protective equipment requirements, aeration periods, and other listed procedures generally do not leave unsafe levels of pesticide residues. Accidents during application may result in a higher, and sometimes unsafe,

exposure. An improper application caused by not following label instructions may also result in injury.

Protecting People

Always apply pesticides in strict accordance with label instructions. Never use a pesticide in a building or other area unless people living or working there can be protected from exposure. This often requires that inhabitants leave the area before an application begins, and that they remain away for a specified period of time after the application has been completed. To reduce personal exposure, remove or cover food and utensils before pesticide applications are made. Protect linens, bedding, and similar items, and open windows and doors in order to increase ventilation after an application has been made. Vacuum carpets and clean floors after a treatment and keep children and pets away from these areas.

Insecticides may be needed to control pests in places where food is stored, prepared, or eaten. If so, special precautions must be taken. For instance, never treat food preparation surfaces with dusts or liquid sprays, and do not allow residues to drift onto food or utensils. If fogs are used, all food preparation surfaces must be thoroughly cleaned after application.

Never make an application near air ducts or ventilation systems unless the system can be shut down for a period of time. Do not apply pesticides inside heating or cooling ducts.

Infants, Children, the Elderly, and People with Medical Conditions

Sometimes the use of pesticides must be restricted or avoided to protect people living in the targeted area. Rely on nonchemical control methods as much as possible, and use a pesticide only where absolutely necessary. When pesticides are needed, choose the safest formulation available, such as a bait or a liquid spray having low volatility, and follow all label instructions and precautions. Be extremely careful when using pesticides in areas occupied by infants, children, the elderly, or a person who is sick. These areas include hospitals, nursing homes, schools, and certain households.

Infants are more vulnerable to pesticide exposure than larger children or adults. This is because of their small size and undeveloped immune system, which is responsible for detoxifying hazardous chemicals. Do not apply a pesticide to any item used for infant care and avoid spraying or dusting carpets, clothing, blankets, towels, or any fabrics that infants or others may contact. When a pesticide is needed in areas where an infant may spend part of the day, use a formulation that will break down completely before the infant returns.

Children under the age of six are active and curious, and it is difficult to keep them away from places where a pesticide has been used for control of household pests. Young children are highly mobile and actively exploring, and put many objects (including their hands) into their mouths. They also frequently crawl on floors and climb on other surfaces. Therefore, never apply a pesticide to play equipment, toys, or any surfaces normally contacted by the youngsters. On carpets, use pesticides that break down rapidly. In all cases, use pesticides having low toxicity and low volatility. If you use bait stations or traps, secure them in a place well out of reach and out of sight.

Elderly people may be susceptible to respiratory illnesses and other physical disorders that may result in them having them a low tolerance to many airborne dusts and chemicals, including certain pesticides. In some instances, their bodies may be unable to properly degrade or eliminate foreign or toxic materials such as pesticides. Therefore, use extreme caution when making pesticide applications in rooms where elderly people sleep or spend long periods of time and, whenever possible, avoid treating these places. In other areas, use a pesticide with low toxicity and low volatility and spot treat as much as possible to reduce potential hazards. Select alternate methods of control whenever possible and always augment pesticide use with other pest control techniques so that the amount of pesticide used can be minimized.

People who are acutely ill or suffer from conditions such as diabetes, alcoholism, allergies, or respiratory disorders including asthma and emphysema may be more sensitive to pesticides in their environment. Medications used to treat illnesses may influence the effects of pesticide exposure. Provide persons who are ill or using medications with the name of the pesticide you plan to use and ask them to contact their physician for advice.

Applicator Safety

Safety risks for applicators working in buildings or enclosed areas are compounded by hazards such as electrical equipment, possibility of explosions, and confined work areas. Learn to recognize hazards in the application site that could cause injury. Avoid pesticide exposure by wearing required or recommended protective equipment. Carefully maintain, clean, and store protective equipment in order to keep it

in good condition and to ensure that it provides optimum protection.

Fire, Explosion, and Electrical Hazards

Fires, explosions, and electrical hazards can occur in residential, industrial, and institutional settings and other areas. Before using a pesticide, examine the intended application site for hazards. For example, never apply a pesticide dissolved in oil or petroleum solvent in an enclosed area if there is any source of spark or flame such as functioning electrical motors, wall switches, appliances, or pilot lights. Before making an application, shut off electric and gas services to the treatment area. Avoid the use of aerosols in wall voids near hot water pipes, since heat from these pipes can ignite solvents and cause a fire. Do not use dust in an enclosed area if there is an ignition source. Any airborne dust at the right concentration can explode. Boric acid dust is capable of extinguishing a pilot light, which could create an explosion hazard due to escaping gas. Most new gas appliances are equipped with safety shut-off devices or igniters in place of pilot lights.

Do not use a water-based spray around electric appliances, outlets, or switches unless the power has been shut off. Water conducts electricity, so you are at risk of electrocution if the spray touches a live power source.

Working in Confined Areas

Confined areas present special hazards to persons making a pesticide application. Confined areas may be attics, crawl spaces beneath buildings, storage areas, closets, small rooms, and other places that have poor ventilation. Hazards include inhaling the pesticide being applied and coming in contact with treated surfaces. Cramped areas also may be uncomfortably hot due to poor air circulation. High temperatures may increase the applicator's exposure potential because sweating accelerates the rate of skin absorption of some pesticides.

Exposure hazards should be reduced when working in confined areas by wearing personal safety equipment. Whenever possible, increase ventilation in the treatment area by opening windows or using a fan to bring in fresh air. Always begin the application from a point farthest from the exit and never walk or crawl through freshly applied pesticide.

To avoid breathing fumes, wear an approved respirator for the pesticides being applied. Be sure it is in good working condition, fits well, and thoroughly forms a good seal around your face.

Prevent skin or eye contact with spray residues or vapor. When making an application, always wear a longsleeved shirt and full-length pants, coveralls, or a lightweight spray suit. Protect your hands with waterproof gloves and use a faceshield or goggles to prevent spray or dust from getting into your eyes. Read the pesticide label carefully for the minimum protective clothing requirements.

Protecting Pets and Domestic Animals

Pets housed in or near residences or other buildings that are to be treated can often include several types of mammals, birds, reptiles, amphibians, and fish. Associated with pets and domestic animals are their food and water supplies, bedding, pens, equipment, and toys.

Most animals are susceptible to injury by pesticides. Some types of pesticides are applied at low doses. Fish and birds are among the most susceptible. Cats are very sensitive because they are metabolically unable to detoxify many types of pesticides. Young animals as well as older or sick animals may be affected by lower pesticide doses than adult or healthy animals. Cats and dogs often lie and sleep on the ground and other surfaces that may have been treated and then they may groom and clean themselves by licking. This process can increase their potential for exposure even when small amounts of pesticide have been used.

In order to provide protection for pets and domestic animals, remove them from the area before making a pesticide application. Keep animals away until the spray dries and the area is well ventilated. Do not apply pesticides on or near animal food, water, or dishes used in feeding. If the animals are returned to the treated area, flea collars should be removed and any ectoparasite systemic medications should be discontinued.

Protect pets in aquariums. First turn off aerators or unplug them so airborne pesticide is not bubbled into the water. Second, cover the tank with newspaper or plastic bags to prevent sprayed pesticide from drifting into the water. Third, place any food or drugs used to treat the pets in plastic bags so they do not become contaminated with insecticide. Protect birds or other animals in cages by asking the owner to remove the pet from the premises or carrying the cage to an untreated bedroom. Keep the animal out of sprayed rooms until the treatment is dry.

Pesticide Drift

If pesticides are not carefully applied, they may drift beyond the treatment site and become deposited as unacceptable residues on surfaces not intended to be treated. These

residues can possibly endanger nontarget organisms. Residues from improper application or improper rinsing of equipment may also result in contamination of surface or groundwater.

Preventing Drift or Unwanted Exposure

Do not use dust formulations in outdoor locations since they easily drift to areas not to be treated. To prevent drift when applying liquid sprays, use low pressures and large nozzle orifices. This reduces formation of small droplets that are subject to drift. Never make an outdoor application of a liquid spray when the wind is blowing faster than 5 miles per hour. If there is a slight wind, select a formulation or adjuvant that reduces drift. Be especially careful if you are spraying near fruit trees or vegetable gardens, flowers, clothing being air dried outside, cars, windows, and dark surfaces that may spot. Special care should be practiced around pet or livestock food and water containers, fish ponds, bird baths, swimming pools, saunas, spas, or outdoor furniture. Avoid outdoor applications that may drift to children's play areas, sandboxes, swing sets, or lawns and shrubbery that children contact.

Do not apply a pesticide in outdoor locations where residues can be carried into a well, stream, pond, or other water source. Never drain or wash application equipment where runoff will enter sewers, sinks, sumps, or drain tile systems. When making a liquid or dust application inside a structure, keep the spray or dust away from air ducts, fans, or blowers in order to prevent the material from being blown into nontarget areas.

Characteristics of Treated Surfaces

Treatment sites may have surfaces whose characteristics must be evaluated before applying a pesticide. Depending on the type of surface, a pesticide can be absorbed and rendered ineffective or the surface may be stained or etched. Concrete, for example, is porous and tends to absorb liquid sprays, reducing the amount of residue on the surface that is available to control target pests.

Floor coverings such as linoleum, tile, and carpeting can be stained or etched by some pesticides or solvents. Certain wallpapers and carpets contain dyes that may run, dissolve, fade, or change colors if exposed to components of some pesticides. Paint and other finishes used on walls or woodwork may also react with spray chemicals to produce spotting or discoloration. Fabrics of all types, and the dyes used to make their patterns and color, may also react, affecting future wear or causing a stain or change in color. A soiled fabric may react differently than a clean one. Fabrics also can absorb a liquid pesticide, reducing pest control effectiveness.

Dust formulations can leave an unsightly residue if applied to surfaces of furniture, woodwork, fabrics, and other items in the treatment area.

Preventing Problems

Stains or color changes may be caused by an excessive dose or by certain application techniques. The formulation type being used may affect staining or spotting. A soiled or greasy surface may increase staining, spotting, or absorption. Paint that has been recently applied and not fully dried or cured has more of a tendency to spot.

Whenever possible, first apply a pesticide to an inconspicuous area, such as a closet, and allow the pesticide to dry for several hours to observe the reaction. Care should be taken when treating upholstery, furniture, drapes, or lower wall surfaces with a pesticide (lower wall surfaces are more likely to be soiled, which may enhance staining or bind the pesticide to make it less effective). Read and follow label directions and precautions carefully to avoid staining, spotting, visible residues, and pesticide deactivation. Thoroughly clean the application equipment before adding a pesticide to prevent a possible reaction between the pesticide and leftover contaminants in the equipment. These contaminants may cause stains or other adverse effects.

When two or more pesticides are mixed, additional problems associated with pesticide compatibility may appear. Check the compatibility of pesticide mixtures before application by mixing a small quantity to determine whether separation or discoloration occurs.

Odor Problems

Many pesticides have odors that can be detected during and after application. Odors are usually strongest when pesticides are first applied. In confined areas, odors may become overpowering and objectionable; they can cause nausea or headache, initiate asthma or other breathing difficulties, or may trigger other medical or anxiety-related symptoms.

An odor may be a chemical characteristic of the pesticide or its solvent, or it may be a substance added to the pesticide as a warning agent to reduce chances of injury. Reduce problems associated with odors by (1) using only the application rate stated on the pesticide label, (2) applying the pesticide in localized areas or as a spot treatment whenever possible, (3) using a low-odor formulation if available and

if appropriate, (4) increasing ventilation to the application area by opening windows and doors or using fans, and (5) applying the pesticide during periods when the building is not occupied.

An odor may also be caused from a reaction between the pesticide and surfaces that have been treated. Before applying any pesticide in a confined area, read the pesticide label to determine if any of the chemicals in the formulation will react with treated surfaces to produce an odor.