



# Brown Recluse and Other Recluse Spiders

## Integrated Pest Management in and around Homes and Structures

Contrary to popular belief, there are no populations of the brown recluse, *Loxosceles reclusa* (Figure 1), in California. In fact, fewer than 20 verified specimens have been collected in the state over several decades by spider experts. Yet people in California frequently relate stories in which they or someone they know was supposedly bitten or they have had a physician diagnose them with a brown recluse spider bite.

Black widows (Figure 2) on the other hand, are very common throughout the state, causing potentially serious injury with their bite. The adult females are easily identifiable by their shiny black body color and red hourglass on the belly. For information on black widows, see the *Pest Notes: Widow Spiders and Their Relatives*.

Although the brown recluse does not live in California, four species of native recluse spiders occur in southern areas of the state and can cause similar medical concerns. The most common Californian recluse spider is the desert recluse, *Loxosceles deserta*. It is found mostly in the Sonoran and Mojave deserts, in the foothills of the lower San Joaquin Valley, and in adjacent areas of Mexico; most of these areas are sparsely populated by humans.

This publication was written to provide science-based information about the status of the brown recluse and other related spiders in California.

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### COMMON AND SCIENTIFIC NAMES

Over the years, the group of spiders to which the brown recluse belongs has been known by various colloquial names: “violin” spiders, “fiddleback” spiders, “recluse” spiders, and “brown” spiders.

The recluse spiders are in the family Sicariidae (formerly Loxoscelidae). The scientific name for the recluse spider genus is *Loxosceles* (lox-SOS-a-leez) and rhymes somewhat with “isosceles” as in the triangle. Whereas “isosceles” means equal legs, “loxosceles” means slanted legs, referring to the way the recluse spiders hold their legs at rest.

All known members of the group have scientific names, and the more familiar members of this group also have common names (e.g., brown recluse, desert recluse, Arizona recluse).



Figure 1. Brown recluse spider, *Loxosceles reclusa*.



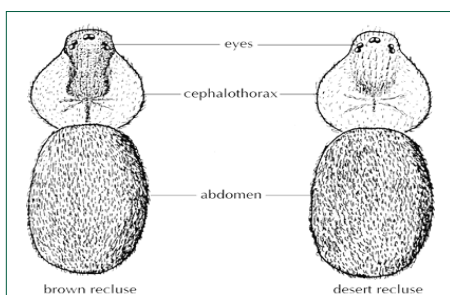
Figure 2. Underside of adult female black widow spider.

### IDENTIFICATION

The most definitive physical feature of recluse spiders is their eyes: most spiders have 8 eyes that typically are arranged in 2 rows of 4, but recluse spiders have 6 equal-sized eyes arranged in 3 pairs, each pair called dyads. There is a dyad at the front of the cephalothorax (the first main body part to which



**Figure 3. Close-up of the cephalothorax (head region) of a brown recluse showing the typical arrangement of eyes.**



**Figure 4. The head region (cephalothorax) and abdomen of a brown recluse, *Loxosceles reclusa* (left), and a desert recluse, *Loxosceles deserta* (right). Note the characteristic spacing of the six eyes arranged in three dyads. The violin marking is well defined on the brown recluse, but is very faint on the desert recluse.**

the legs attach) and another dyad on each side further back with a space separating the dyads from one another (Figure 3).

Many publications refer to the “violin” marking on the dorsal (top) surface of the cephalothorax (head region) as the most important diagnostic feature (Figure 4). Although this marking is fairly consistent in mature brown recluses and Texan recluses (*Loxosceles devia*), it can vary in intensity, sometimes fading on preserved specimens, and it is very faint to nonexistent in several recluse species found in the southwestern United States (e.g., the desert recluse, *Loxosceles deserta*).

Therefore, checking the eye pattern is the best way to eliminate almost all suspect non-recluse spiders from consideration, whereas the presence or absence of the violin marking may lead to misidentifications. Non-arachnologists (including physicians, pest control operators, and even some entomologists) have envisioned “violins” on various body surfaces of harmless spiders and incorrectly assume that they have properly identified a brown recluse spider.

In addition, the abdomens of all North American recluses are covered with fine hairs and are uniformly colored (not patterned), although the coloration can vary from light beige to dark brown, depending in part on what they have eaten recently. There is never a color pattern on the abdomen of North American specimens.

Finally, the uniformly colored legs are similarly covered with fine hairs whereas many non-recluse spiders have stout spines and a pattern of stripes, rings, or spots on their legs (Figure 5).

Some other spiders share one or more of these physical characteristics.

However, to be identified as a recluse spider, it must have all 5 of these characteristics.

- six eyes in dyads (pairs)
- uniformly colored abdomen with fine hairs
- no spines on the legs
- uniformly colored legs
- body not more than  $\frac{3}{8}$ " in length

On this basis, more than 99% of the spiders found by Californians can be identified as something other than a recluse spider.

In the unlikely event that one does find a recluse spider in California, it will most likely be the native desert recluse, *Loxosceles deserta*. To identify *Loxosceles* spiders to species level requires a high-magnification microscope and the skills of a spider expert (arachnologist).



**Figure 5. Brown recluse spider showing the uniformly colored legs covered with fine hairs.**

## SPIDERS COMMONLY CONFUSED WITH RECLUSES

Because of the misinformation surrounding the brown recluse's presence in California, many spiders that are virtually harmless are submitted by the public to arachnologists for identification. Most of them are not from the recluse family and some are not even spiders.

A nationwide study was undertaken from 2000 to 2005, offering to identify any spider that was considered to be a brown recluse spider. Nearly 600 specimens were submitted from California, many from people who were adamant that they had a brown recluse. Only one of these specimens was a brown recluse, from a house where the family had moved from Missouri, a state that is well-known to have abundant brown recluse populations. No additional recluses were found in the house. The occasional finding of a translocated brown recluse spider is not surprising; however, it still is extremely rare.

There were 17 desert recluse spiders submitted in this study, all from the desert regions of southeastern California where the spiders are known to occur. Non-recluse spiders were





**Figure 6. A spitting spider has the same 6-eye pattern as a recluse spider but the body coloration looks nothing like a recluse.**

submitted in great numbers including many false black widows, woodlouse, and yellow sac spiders.

Presented below are descriptions of spiders that share some of the same physical features as the brown recluse and have been misidentified as recluse spiders. For additional information on these spiders, consult a spider identification book such as *Common Spiders of North America* by Richard Bradley, listed in the References section or the table of common spider families found in California, located in the *Pest Notes: Spiders*.

### Six-Eyed Spiders

Spitting spiders (*Scytodes* spp.) (Figure 6) are closely related to recluse spiders and have 6 eyes arranged in a similar pattern. However, unlike recluse spiders, they also have many black spots or lines on their bodies and a strongly domed cephalothorax.

The woodlouse spider, *Dysdera crocata* (Figure 7), has 6 eyes arranged in 2 groups of 3 (triads) and no bodily markings.

### Spiders with Violin-Shaped or Other Dark Markings

Many common tan or gray spiders have dark markings on the head region, which convinces people that they have caught a true recluse spider. These spiders include cellar spiders (*Pholcus phalangioides*, *Psilochorus* spp., *Physocyclus* spp.) (Figure 8), pirate spiders (*Mimetus* spp.) (Figure 9), and



**Figure 7. The woodlouse spider has 6 eyes arranged in trios, not pairs. Additionally, they have no violin pattern on the cephalothorax.**

sheet web spiders (Linyphiidae family). The marbled cellar spider, *Holocnemus pluchei* (Figure 10), also confuses people even though the dark marks are on the ventral (underside) not the dorsal (top) surface of the body.

The most common submissions as brown recluses are spiders in the genus *Titiotus* (Figure 11). These spiders are found just north of Los Angeles, through central California to Redding and are common in forests. *Titiotus* spiders have a hair pattern that gives the impression of a violin and its coloration is similar to that of a brown recluse.

Another frequent submission is *Zoropsis spinimana*, which is found in the San Francisco Bay area and Sacramento. It is a harmless Mediterranean immigrant species, first detected in California around 1995. It is large and frequently captured in homes. Residents see the dark marking on the top surface of the abdomen as a violin, but recluses have this type of marking on their cephalothorax. See the *Pest Notes: Zoropsis spinimana, A Mediterranean Spider in California* for more information.

### Ubiquitous Brown Spiders

Virtually every spider that is tan or brown has been turned in by Californians as a potential brown recluse. There are hundreds of species of these spiders in California. They include ground spiders (Gnaphosidae), sac spiders (*Cheiracanthium* spp., *Trachelas* spp.), wolf spiders



**Figure 8. This cellar spider (*Psilochorus* spp.) has a dark marking that looks very much like that of a brown recluse but the dark markings on the abdomen indicate that it is not a recluse spider.**



**Figure 9. This pirate spider (genus *Mimetus*) has a dark marking mistaken as the violin of a recluse spider but can be distinguished as not a recluse by having 8 eyes, conspicuous leg spines, and more than one color on its abdomen.**



**Figure 10. Marbled cellar spider often is confused with brown recluse spider despite the fact that the perceived violin-shape is on the underside of the body.**



Figure 11. *Titiotus* spp. female.



Figure 12. Male black widow spider.



Figure 13. Male false black widow spider.

(Lycosidae), grass spiders (Agelenidae), orb weavers (Araneidae), and male crevice spiders (Filistatidae).

Additionally, males of both the western black widow, *Latrodectus hesperus*, (Figure 12) and the false black widow, *Steatoda grossa*, (Figure 13) are frequently brought in as suspected recluse spiders.

All of these brown spiders have 8 eyes and thus can be quickly eliminated from consideration.

## AMERICAN RECLUSE SPIDERS

Eleven species of recluse spiders are native to the United States and two non-natives have become established in certain highly-limited areas of the country. The brown recluse spider is the proper common name for only one species, *Loxosceles reclusa*. It is the most widespread of the North American recluse spiders and lives in the south central Midwest from south-eastern Nebraska to southwestern Ohio and south through Texas to north Georgia (Figure 14).

In addition to these native species, the Chilean recluse spider, *Loxosceles laeta* (pronounced "LEE-ta"), has become established in portions of Los Angeles (Alhambra, Sierra Madre, Monterey Park, and San Gabriel). This spider, however, seems to be confined to a very limited area in Los Angeles County, has been present there for at least 80 years (one specimen was collected from Los Angeles in 1936) and is not spreading.

Also, occasional interceptions of the Mediterranean recluse, *Loxosceles rufescens*, are found in commercial goods shipped from out-of-state or from international cargo, but no populations of this spider are currently known in California and finds of them are still incredibly rare.

## HABITAT AND LIFE CYCLE

Recluse spiders, as their name implies, are reclusive. They build webs as trigger systems to indicate that potential prey are walking nearby. They also use silk to build retreats in which to hide during the day. These nocturnal spiders emerge from their retreats at night and actively hunt down prey or may wait for prey to land in the small area several inches from their retreat.

As dawn approaches, they may seek shelter in dark places such as in clothing or shoes, and mature males roam in search of females. It is these two behaviors that can bring them into contact with people.

In nature, recluses are found in cracks and crevices in and under rocks or the loose bark of dead trees. Recluses have very much benefited from human-altered environments, where they are readily found under trash cans, plywood, tarps, rubber tires, and in storage boxes.

They are synanthropic (found in association with humans) and therefore are considered "house" spiders. In fact in South America, the recluse species

have common names that translate as "the spider behind the picture" or "the spider in the corner."

Recluse spiders are relatively long lived. Among the various species, they mature after about 1 year and average a 2- to 4-year life span with some living more than 7 years under laboratory conditions. They are also well known for surviving long periods (6 to 12 months) without food before perishing.

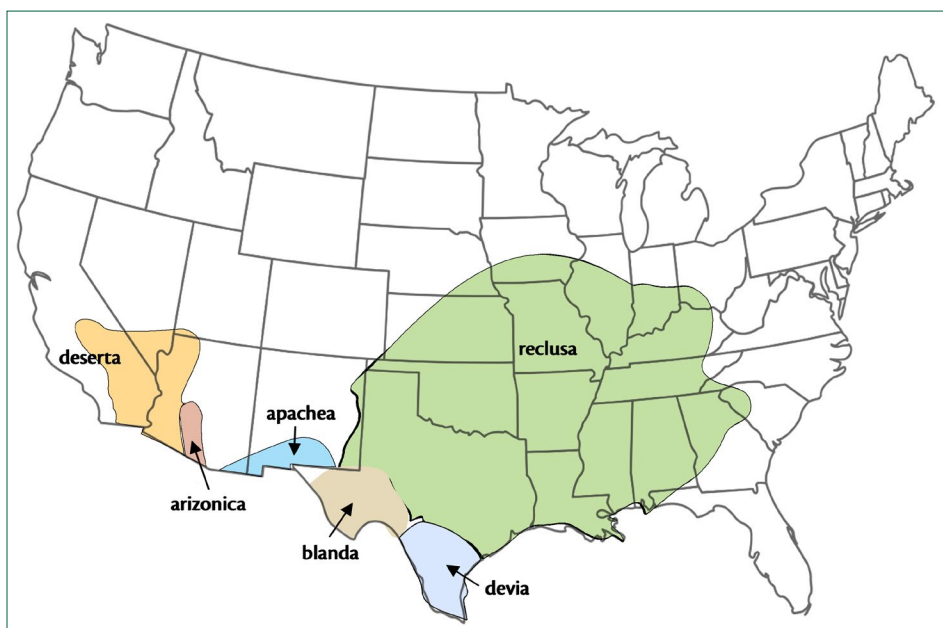
## Abundance of Recluses

One consistent life history characteristic of recluse spiders is that in the right environment their populations are usually dense. If you find recluses, you do not find one, you find many. The brown recluse spider, *Loxosceles reclusa*, is a common house spider in the midwestern United States.

Examples of the densities that the brown recluse can attain around human habitation include 9 under a piece of plywood in Oklahoma, 52 in an indoor laboratory, 6 under a waterbed frame in Arkansas, 40 collected in a Missouri barn in 1 hour, and 44 caught in sticky traps in a Tennessee home in one day. Eight Oklahoma 13-year-olds unknowingly hand-collected about 60 amongst bricks in about 7 minutes without getting bitten.

In a 6-month study, a family in Kansas collected 2,055 brown recluse spiders in their 19th-century built home. They lived there nearly a decade, continued to find brown recluse spiders regularly, and only once in 10 years had anyone





**Figure 14.** This map shows the established areas of six species of recluse spiders in the United States. The brown recluse spider, *Loxosceles reclusa*, is the most widespread, living in the southcentral Midwest from Nebraska to Ohio and south from Texas to Georgia.

shown evidence of a bite; it was to a finger which turned red for a few days and then healed without incident. In fact, on many evenings, this family collected more brown recluse spiders per hour in their home than the entire California human population has ever been able to find in the state.

Similarly, for the desert recluse in California, 12 of these spiders were collected under a doghouse in Yucca Valley and 6 were removed in one night from a small cottage bedroom in a Mojave Desert research facility.

### **Absence of Brown Recluses in California**

Unlike many other spiders that disperse by either migrating or being carried by air currents when small ("ballooning"), recluse spiders usually only expand outside their native range as a result of human intervention. The few brown recluses that have been collected in California typically are found in facilities that receive goods from out of state or are unintentionally transported by people who have moved from the Midwest. In these instances, searching the immediate area yielded

no additional brown recluses so they were considered to be individual stowaways.

Undoubtedly, more brown recluses have been inadvertently brought into the state via commerce and the relocation of household belongings, especially during the Dust Bowl era; however, amazingly few specimens have ever been collected. Translocated recluse spiders have never been able to establish a foothold and start a population in California.

Considering that brown recluse spider bites are not common in the south-central Midwest where brown recluses frequently cohabit with people, it is clear that California does not have anywhere near sufficient populations of these spiders to be responsible for the number of bites that are attributed to them.

### **DAMAGE**

All *Loxosceles* spiders tested so far have the venom component that is capable of causing necrotic skin lesions, so it is best to assume that all recluse spiders may be capable of causing skin damage. In general, the desert recluse

spider's venom is similar to that of the brown recluse and should be considered of equal potency.

In comparison to the brown recluse spider, the Chilean recluse supposedly has more potent venom and the Mediterranean recluse's venom has been said to be less potent. However, these comparisons are more anecdotal than quantitative assessments.

About 10% of brown recluse bites cause moderate or greater tissue damage and scarring, but the vast majority only result in inflammation and heal well without medical intervention. Deaths have been reported in children, however these are extremely rare occurrences and can be prevented if accurately diagnosed and the proper medical treatment applied.

### **Medical Misdiagnoses**

The problem of misdiagnosis is widespread in North America, including such unlikely places as Alaska and Canada where doctors have attributed skin lesions to recluse bites when no brown recluse spiders have ever been found north of the 48 contiguous U.S. states.

One reason for the great awareness of the recluse spiders throughout North America is that necrotic (rotting flesh) wounds are commonly misdiagnosed as "brown recluse bites." Although recluses can cause these types of wounds, the biological data involving the distribution of the spider indicate that most of these diagnoses are incorrect.

A world-renowned toxicology physician who worked at University of Southern California Medical Center estimates that most general spider bites in California referred to him were actually the work of other arthropods, and that 60% of "brown recluse spider bite" diagnoses came from areas where no *Loxosceles* spiders were known to exist.

This is a serious problem, in that several medical conditions misdiagnosed as recluse bites can lead to debilitating and potentially fatal consequences.

Additionally, many people diagnosed

as having brown recluse bites in California are treated with antibiotics. Antibiotics work against bacteria and have no effect on spider venom. However, regardless of the causative agent, it is wise to seek medical attention if you feel that it is warranted.

Because most brown recluse bites involve only inflammation, the recommended treatment is simple first aid: RICE therapy (Rest, Ice, Compression, Elevation) although other medical experts suggest cold instead of ice (to avoid freezing tissue) and a neutral position (lay flat) rather than elevated.

### Multiple Lesions

Spiders typically bite only once as a desperate defensive effort before they are crushed between flesh and some object. Therefore, spider bites are not the causes of skin lesions if 1) there are multiple lesions on one person at the same time, especially if the lesions are on widely separated parts of the body, 2) if there are multiple episodes of lesions on the same person over a period of several weeks or months, or 3) if there are multiple people in the same house or facility showing skin lesions at the same time.

Multiple lesions immediately point toward the more likely situation of a contagious bacterial infection like methicillin-resistant *Staphylococcus aureus* (MRSA) or possibly an infestation of an arthropod (fleas, mites, kissing bugs, bed bugs, etc.) that seeks out mammals for blood meals.

### Bacterial Infections

Group A *Streptococcus* infection, also known as necrotizing fasciitis, is sometimes misdiagnosed as a brown recluse bite, and has a fatality rate that can vary from 20 to 80% depending on how quickly it is correctly diagnosed. In serious cases, death from *Streptococcus* A can occur in a few days.

Another medical condition that is frequently misdiagnosed as a spider bite or brown recluse bite is MRSA bacterial infection. Infections of this pathogen, which began to emerge in the 1990s,

### RICE Therapy:

The recommended treatment for most brown recluse bites (the ones that do not develop severe symptoms) is simple first aid: RICE therapy.

- Rest
- Ice
- Compression
- Elevation

are no worse than other Staph infections. However, because they are not remedied by common antibiotics, the infections continue out of control and can be fatal unless properly medicated. In one national study involving 11 university-based medical facilities, 29% of the patients presenting for “spider bite” had MRSA as the cause of their skin and soft tissue injury.

MRSA is a contagious infection, frequently found in places where people are housed in close quarters for lengthy periods of time. Such conditions include prisons and other correctional facilities, nursing homes, long-term health care facilities, sports camps, military barracks, and locker rooms and typically involve several people being afflicted simultaneously. Very often “spider bites” are the first thing that people blame as the cause of these wounds. However, more careful investigation typically leads to identifying a MRSA bacterial infection as the causal agent. The problem clears up quickly when the bacterial infection is correctly diagnosed and treated.

### Necrotic Wound Causes

If you do get a necrotic wound in California, you and your medical professional should consider many other common causes to be much more probable than a bite from a brown recluse spider.

If an arthropod is involved at all, one should first consider all those creatures that seek out mammals for blood meals

and may cause necrotic-type wounds. These include mites, fleas, bed bugs, mosquitoes, soft ticks, hard ticks, and blood-sucking conenose bugs (also known as kissing bugs) (see *Pest Notes: Fleas, Bed Bugs, Mosquitoes, Conenose Bugs, and Lyme Disease in California* listed in SUGGESTED READING).

In addition, there is a long list of medical conditions and diseases that exhibit necrotic-type wounds. A few of these are *Staphylococcus* and *Streptococcus* bacterial infections, lymphomatoid papulosis (a non-Hodgkin’s disease lymphoma), diabetic ulcer, pyoderma gangrenosum, infected herpes simplex, herpes zoster (“shingles”), chemical and thermal burns, poison ivy, poison oak, and Lyme disease. Any and all of these situations are more likely than the bite of a brown recluse spider in California.

## MANAGEMENT

If you do not live in the shaded areas on the map of California, you do not need to be concerned with recluse spiders. If you do live within the range of these spiders, you still need to verify that you have recluses on your property before attempting control.

Not all micro-habitats within the shaded areas will be suitable for recluse survival. For example, even though *Loxosceles laeta* occurs in densely populated sections of Los Angeles, this species is usually found only in dark commercial and municipal storage basements, not in homes.

This leaves the desert recluse as the only California species of concern, and a minor one at that. After verifying that you do have desert recluses in your home, there are steps you can take to reduce encounters with them. These measures are similar for reducing encounters with spiders in general.

### Nonchemical control

The most important precaution is to remove or reduce outdoor trash and rubbish, such as woodpiles, boxes, plywood, tires, and trash

cans—especially if they are stored right next to the house. In residences with attached garages, block off house access to spiders by sealing cracks around doors and access holes for electrical conduits or plumbing.

In the Midwest, some brown recluse bites occur when a sleeping person rolls over during the night, and the trapped spider bites in self defense. In the bedroom, move the bed away from the wall, remove any bed skirts or ruffles and remove all items stored under the bed. This minimizes the chance that any spider can crawl onto the bed and inflict a bite.

Do not leave clothes and shoes on the floor, or shake them before dressing if they are left out. Apparel and

equipment that is only occasionally used (gardening clothes and gloves, boots, baseball mitts, seasonal clothes and gear, etc.) should be stored in tightly closed plastic bags or bins, especially if stored in the garage or other dark storage areas.

Sticky traps placed along floor boards out of the reach of pets and young children offer a non-insecticidal way to trap spiders as well as provide an idea of population levels in the structure. You can also remove a spider from your home by placing a jar over it and slipping a piece of paper under the jar that then seals off the opening of the jar when it is lifted up. See the short UC IPM YouTube video [How to Catch a Spider](#).

## Chemical control

Typically, pesticide control of spiders is difficult unless you actually see the spider and are able to spray it. There are various insecticides available in retail outlets labeled for spider control. It is just as easy and much less toxic for your living area to crush the spider with a rolled up newspaper or your shoe.

If you plan to send the spider to an expert for identification, try to keep it in an undamaged condition because a crushed specimen may be difficult to identify. Freeze the spider first, soak it in rubbing alcohol for a few days to preserve it, then pour off the alcohol and rinse the spider with water to remove alcohol residue before shipping. When sending the spider in for identification, do not mail it in alcohol as this is a violation of postal regulations.



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Pesticides are poisonous. Some pesticides are more toxic than others and present higher risks to people, nontarget organisms, and the environment. A pesticide is any material (natural, organic, or synthetic) used to control, prevent, kill, suppress, or repel pests. “Pesticide” is a broad term that includes insecticides, herbicides (weed or plant killers), fungicides, rodenticides, miticides (mite control), molluscicides (for snails and slugs), and other materials like growth regulators or antimicrobial products such as bleach and sanitary wipes that kill bacteria.

Always read and carefully follow all precautions and directions provided on the container label. The label is the law and failure to follow label instructions is an illegal use of the pesticide. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, and animals. Never place pesticides in food or drink containers. Consult the pesticide label to determine active ingredients, correct locations for use, signal words, and personal protective equipment you should wear to protect yourself from exposure when applying the material.

Pesticides applied in your garden and landscape can move through water or with soil away from where they were applied, resulting in contamination of creeks, lakes, rivers, and the ocean. Confine pesticides to the property being treated and never allow them to get into drains or creeks. Avoid getting pesticide onto neighboring properties (called drift), especially onto gardens containing fruits or vegetables ready to be picked.

Do not place containers with pesticide in the trash or pour pesticides down the sink, toilet, or outside drains. Either use all the pesticide according to the label until the container is empty or take unwanted pesticides to your local Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Follow label directions for disposal of empty containers. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

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