

MYSTERY BITES:

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ABOUT THE SPONSOR

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Diagnosis and Management

It can be very challenging when clients complain that "something" is biting them. Use this handout to educate employees and customers before taking action.

► BY MICHAEL F. POTTER

Nearly everyone at times experiences what seem like bug bites. The irritation may be accompanied by welts, rash, itching, or perhaps the feeling that something is crawling over the skin. Even when no bugs are apparent, the annoyance may trigger a call to a pest control firm, rationalizing that "spraying" will fix the problem. Unfortunately, pesticides may not be the answer. Unless the underlying cause is discovered, the discomfort will likely continue.

It is important to realize that there are many causes of bite-like reactions — some related to pests and others that are not. Pest management professionals are trained to determine if insects or mites are the culprit. As a service to customers, they may also suggest other possible sources of irritation and refer clients to dermatologists and other allied professionals.

STARTING THE INVESTIGATION. The cause of a 'bug-bite' complaint is often far from obvious. Investigations should be thoughtful and systematic, ruling out likely possibilities through process of elimination. A good operating principle is that pesticides *will not* be applied unless biting pests are discovered or strongly suspected (see sidebar on page 2).

It is useful to interview the client before inspecting the premises. In commercial accounts, this may involve talking with management as well as affected employees. A questionnaire (see Figure 1) can be helpful for gathering facts that may solve the mystery. One of the most important questions to ask is if anyone has actually *seen or captured* any bugs as the irritation is occurring. With a few notable exceptions (e.g., bed bugs, certain types of mites), most pests that bite humans are likely to be seen as the irritation is felt. Ask also about the pattern of bites within the building: Are several people affected or just a few? In which locations are incidents being reported? Is there an association between onset of symptoms and certain maintenance activities, such as installation of new carpet, or work on the heating and cooling system? Have there been birds, bats, rodents, or other

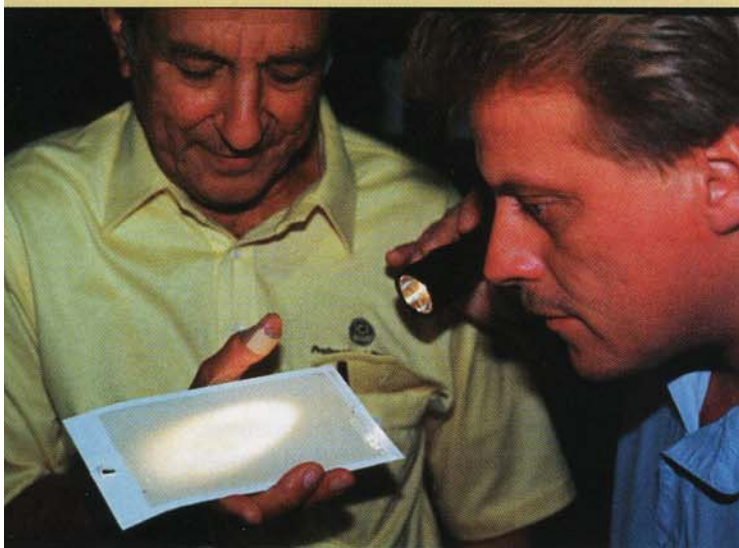


Bits of debris like these (suspected of 'biting' factory workers) are often mistaken for pests.



No Bugs = NO SPRAY

A good rule of thumb in mystery bite cases is that no pesticide be applied unless biting pests are discovered or strongly suspected. Treating without a known target pest misleads customers into thinking that spraying will fix the problem, which it seldom does. Additional applications will be expected thereafter whenever someone complains of an itch. Another reason not to spray unless pests are discovered is that some people react negatively to the thought of pesticides — and may even begin thinking that “the chemicals” are the source of their suffering. Clients should be informed that a thorough inspection (aided by information from the interview) is more likely to yield a solution.



Installing glue traps can sometimes help resolve mystery bite incidents.

animals that could possibly be harboring mites or other parasites? Such questions can yield important clues worthy of further investigation.

THE INSPECTION. Mystery bite investigations differ from inspections for cockroaches, termites or other pests since the ‘culprit’ is unknown. The list of potential irritants is long and many fall outside the realm of pest control. Inspections should

mainly seek to determine if biting pests are involved. If they are not, customers may still want to know about other factors (unrelated to pests) which may be causing the discomfort.

During the investigation, various specimens will require identification. Many will be small, requiring at least 10X magnification to differentiate potential biters from harmless insects or bits of debris. Ideally, clients should submit specimens in non-crushable containers instead of in envelopes or under tape. Another method of capture is to install several glue traps at locations where bites have been reported. Although the traps are not always reliable, they help reinforce that every effort is being taken to find pests if present. Persons complaining of invisible mites or insects crawling over their skin are sometimes told to place strips of clear cellophane tape over the affected area while the sensations are occurring. Unfortunately, this seldom reveals the cause of a mystery bite problem. Neither does collecting samples from carpet and floors with a vacuum. Industrial hygienists may use suction devices for collecting fibers and air-borne contaminants, but the technique seldom reveals biting pests and samples are tedious to sort through and process. The appearance of bites or welts on the body can also provide clues, although “bug bites” are difficult to diagnose, even by physicians. The most useful tactic for these cases is knowing where and what to look for. With mystery bites, the list of potential irritants is extensive.

SOURCES OF IRRITATION. Irritations of unknown origin may be from arthropods (insects or mites) or a multitude of other factors having nothing to do with pests. Mentioned below are the more common sources worthy of consideration.

Obscure Biting Arthropods. In some mystery bite cases, insects or mites truly are the culprit. The following ones should be foremost in the minds of inspectors.

Fleas are probably the most common source of insect bites within homes. Fleas are fast moving and jump when disturbed. However, because they are brownish and about 1/8” long, they are usually observed. Bites typically occur around the lower legs and ankles, producing a small, red, hardened, itchy welt. Fleas are most often associated with pets, although the presence of mice, rats, squirrels, skunks, possums or raccoons

Your Guide To **MYSTERY BITES**



Fleas generally bite low on the leg, whereas bed bugs attack any exposed skin.

can also result in infestations. Animal hosts need to be present for extended periods for fleas to become established — a brief visit by a dog or cat, for example, is unlikely to cause problems. Infestations can be confirmed by

examining pets (best left to the pet owner or veterinarian), installing flea light traps, or walking the premises in white socks pulled high.

Bed bugs are becoming increasingly common and should always be considered a possibility in mystery bite inspections. People are generally bitten at night while they are sleeping. Initially the bite is painless and victims seldom know they are being bitten. The typical reaction is itchy red welts on exposed skin appearing within a day or so of the incident. Others have little or no reaction to the bites. Since bed bugs also remain well hidden, victims often are bitten repeatedly yet never see an insect. Confirmation requires finding the bugs, shed skins or dark fecal spots of digested blood, which can take considerable effort especially in the early stages of infestation. The possibility of bed bugs increases if the client has been traveling, or acquired used beds or furnishings before symptoms started to appear. Bed bugs also are suspect if a person wakes up with itchy welts they did not have when they went to sleep.

When bed bug-like insects are found, it is important to consider whether bats, birds or other wild hosts are involved. Although similar in appearance to the kind



Bed bugs are becoming increasingly likely mystery bite culprits.

of bed bug that prefers humans, bat bugs and bird bugs require different management procedures.

Lice are another potential source of itching and irritation. Infestations occur on the head and other hairy areas of the body. Lice are tiny, whitish-grey insects that are visible under close examination by the client or physician. Because they largely remain on the host, treatment of premises is not required nor recommended. The types of lice that bite humans are mainly acquired through close personal contact or sharing of hats or combs.

Mites are tiny pests that occasionally bite and irritate humans. Some feed on animals, others infest stored foods, and some dwell outdoors in vegetation. Contrary to popular belief, most mites that bite people in buildings are large enough to be seen with the naked eye. There also is no such thing as a 'cable', 'computer' or 'paper' mite — these terms are purely fictitious. Mite infestations in buildings can result from birds nesting in eaves, attics, etc., or from mice or rats. When a bird or rodent dies or leaves the nest, thousands of parasitic mites can migrate indoors and bite humans. Domestic fowl (chickens, parakeets, etc.), gerbils and hamsters also may harbor mites capable of biting people. Bird and rodent mites are tiny, but appear as dark slow-moving specks about the size of the period at the end of this sentence. Mites cannot jump or fly.

A few parasitic mites are too small to be seen with the naked eye. The human scabies mite burrows into the skin, causing intense itching accompanied by a rash. Skin between fingers, wrists, elbows and shoulder blades are areas most often affected. Transmission of scabies mites occurs only through close personal contact or sharing the same bed. Fortunately, scabies is a rather rare condition that is readily diagnosed by competent physicians. No treatment of premises is needed since these mites cannot survive off a human.

Various mites living indoors also infest stored food products such as grains, meats, cheese and dried fruit. Food and mold mites tend to infest items stored for long periods that have become moist or moldy. Tremendous numbers may develop in such places as pet food bags, non-refrigerated smoked meats, or caged animal litter. At times populations may disperse outward from breeding sites and annoy humans. Food and mold mites do not suck blood but can irritate the skin. They appear as tiny, pale-colored slow-moving specs on dark surfaces.

Other mites that can bite humans live outdoors



Your Guide To MYSTERY BITES

in vegetation. Chiggers (the immature stage of the harvest mite) live in tall weeds and dense vegetation. They crawl onto people and attach where clothing fits tightly, such as around ankles, waist or armpits. Chigger bites produce hard red welts that begin itching intensely within 24 hours. Consequently, people may not associate the irritation with being bitten outdoors the day before. Another nearly microscopic biter, the straw itch mite, infests straw, grain or hay. Severe rash and itching results from handling infested materials in barns, stables, etc. Yet another type of itch mite inhabits the leaf galls of oak trees. In late summer or autumn, tremendous numbers of the mites can become airborne, landing on people. The bites are red, itchy, and painful, appearing on the face, neck, chest and arms. Fortunately, outbreaks of this mite are sporadic and have been reported mainly in the Midwest. Itch mites may be the culprit if the victim was outdoors near oak trees. Like chigger bites, the irritation may not be felt until the following day. Delayed reaction to bites is also common with ticks and mosquitoes, and from exposure to poison ivy/oak. Asking clients if they've spent time outdoors can help determine if such pests might be involved.

One additional mite worth mentioning is the house dust mite. Dust mites are common indoors where they feed on dander (bits of shed skin) from people and pets. Large numbers may persist in beds, couches and carpet, but are generally too small to be seen with the naked eye. Clients sometimes think dust mites are capable of causing itching and bite-like reactions but this is untrue. Their annoyance is limited to an ability to cause allergies, with symptoms such as stuffy or runny nose, sneezing, cough, watery eyes and asthma. Diagnostic kits for detecting house dust mites can be bought from pharmacies and allergy testing

can be performed by a physician.

Thrips are tiny (1/16") straw-colored insects that feed on plants. They have piercing mouthparts for sucking plant juices but can also bite humans. The bite feels like a pinprick. In late summer, huge numbers of these insects may become airborne, landing on people's clothing and skin. Some also may be transported on air currents into factories, warehouses, etc. Although houseplants are seldom the source for these or other biting pests, they are still worth checking during inspections.

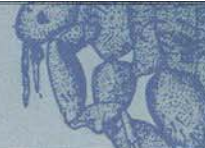
Sand flies, also called biting gnats, punkies or no-see-ums, breed in swamps, marshes and other moist areas outdoors. They are vicious biters yet so small (1/32"-1/8") that their presence often goes unnoticed. Fortunately, biting flies seldom breed indoors. Several other tiny flies which are harmless (e.g., fungus gnats) *do* occur indoors, however, and will need to be identified to alleviate customer concerns.

Spiders are often thought to be responsible for bites of unknown origin. In truth, most spiders are harmless, timid creatures and bites are a rare event. When spider bites do occur, it usually is in response to being crushed or squeezed; they do not 'pounce' on a person as they would a fly. As with other potential biters, it is extremely difficult to diagnose a spider bite from the lesion alone. Lacking an actual spider doing the biting, such diagnoses *even by physicians* should be regarded as little more than a guess.

Non-Arthropod Irritants. If the inspection reveals biting insects or mites, appropriate control

Skin and dried blood samples from a delusions of parasitosis patient. Treatment of the disorder falls far outside the realm of pest control.





measures should be taken. If no biting pests are discovered, the inspector may want to curtail any further involvement except to report their findings and refer the client to a dermatologist or industrial hygienist. Some customers, however, will not initially take such action. (Even a small indoor air quality survey of a residence, for example, can cost upwards of \$1,000). Consequently, pest managers are sometimes asked to comment about other likely sources of irritation, and what measures might alleviate the problem. Following are some of the more common non-pest irritants to consider.

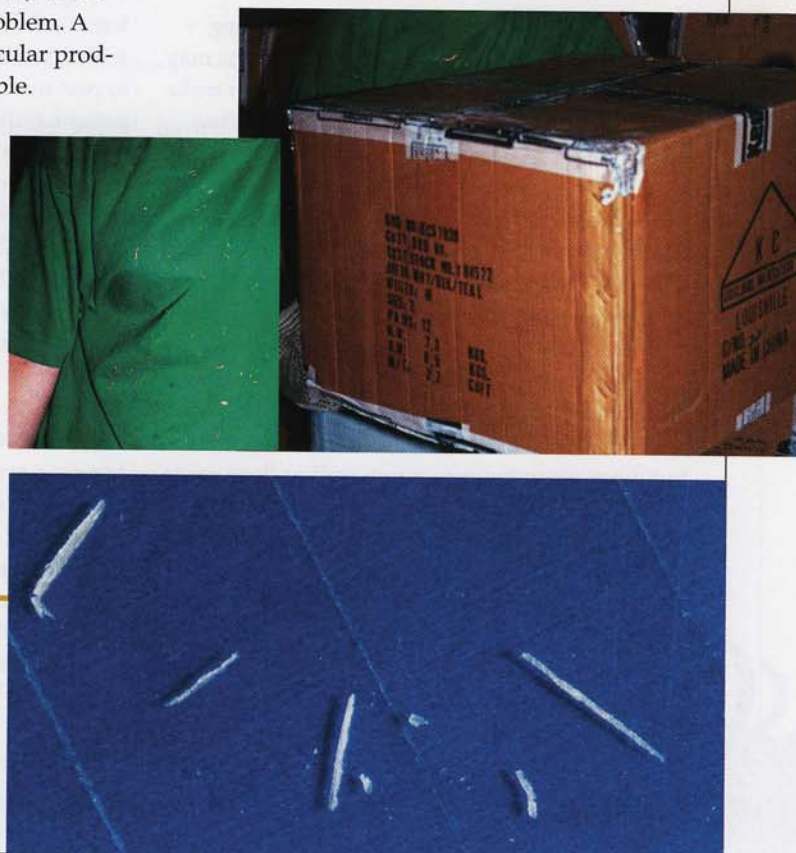
Household Products. Everyday items found in homes and businesses can cause skin reactions similar to insect bites. Products most often implicated include soaps, detergents and cleansers, cosmetics, hair products, medications, paper/corrugated cardboard, printing inks (as from multiform carbonless paper), and certain types of clothing, especially those containing fire retardants. Sometimes the location of the rash or irritation suggests the cause. For instance, a rash on hands and arms of factory workers might be due to cleaning compounds or materials they are handling such as cardboard. If a connection can be made to one of these possible irritants, avoiding further exposure may solve the problem. A dermatologist can confirm that a particular product — rather than a pest — is responsible.

Environmental Factors. When multiple people experience itching and irritation in the absence of pests, the cause is often some irritant in the environment. Among the most common are tiny fragments of paper, fabric, or insulation (see illustration). When these adhere to skin, they can produce symptoms ranging from a mild prickling or crawling sensation to intense itching accompanied by rash, welts or sores. If fibers or fragments are involved, the irrita-

tion usually occurs on exposed areas of the body — arms, legs, face, neck, etc. Such problems are rather common where large amounts of paper or cardboard are processed, like offices, filing rooms, and warehouse/distribution centers. New or badly worn carpets, drapes, and upholstery also shed fibers that can irritate skin. Laundering clothes or blankets in a washer/dryer previously used to clean curtains can likewise cause irritation due to the shedding of fiberglass and other materials. Other possibilities include sound-deadening fibers from ceiling tiles, or insulation fibers emitted from heating/cooling systems. These are especially likely if there has been recent repair work on the ceiling or air-handling system.

Irritation can be worsened by static electricity, which increases the attraction of particulates to exposed skin. Low humidity, electronic equipment, and nylon in carpeting, upholstery, or women's stockings all increase levels of static electricity and the potential for particle-induced irritation. Static electricity also causes body hair to move, giving the impression something is crawling over the skin.

If fibers or fragments are suspected, floors, furniture and work surfaces should be thoroughly



Top: Cardboard is a common skin irritant of industrial workers.

Bottom: Paper splinters and insulation fibers can cause irritation mistaken for insect bites.



cleaned. In offices, static-reducing measures can be considered, such as raising the humidity level of the air and installing static-resistant mats under chairs. Anti-static sprays can be used to treat seat cushions and nylon stockings. Dryness alone can also cause irritation, producing a condition known as "winter itch." As skin loses moisture,

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itching results — a particular problem during winter and in older people. Similar reactions may occur from changes in temperature that can make skin more sensitive. A skin moisturizer is often helpful in these situations.

Volatile indoor pollutants can also cause irritation. Although such compounds most often cause headaches or eye, nose, and throat discomfort, some may cause welts and rashes. Materials most often implicated include ammonia-based cleansers, formaldehyde emitted from materials such as plywood, carpet, and cardboard, tobacco smoke, and solvents and resins in paints and adhesives. Reactions often occur in industrial settings or buildings receiving new paint, wall or floor coverings. If indoor air pollutants are suspected, the client may want to contact an industrial hygienist to monitor for allergy-producing contaminants. Companies specializing in environmental health monitoring have listings in the telephone directories of most cities.

Medical Conditions. Health-related conditions also may cause symptoms mistaken for bug bites. Itching and irritation are common during pregnancy, especially during the last trimester.

Similar symptoms are associated with diabetes, liver, kidney, and thyroid disorders, and herpes zoster (shingles). Food allergies and prescription or recreational drugs are other common causes of such symptoms. One's overall emotional state (including stress at work or home) can also trigger skin irritation. Moreover, the response can be induced in other people simply by the 'power of suggestion.' When one person in a group experiences itching and irritation and talks about it, others often feel the urge to scratch as well.

Delusions of parasitosis is a more serious emotional disorder characterized by the conviction that living organisms are infesting one's body. Delusory parasitosis patients have similar symptoms and patterns of behavior which tend to sound unusual. Patients typically report bugs or mites invading their ears, nose, eyes, and other areas of their body — often vanishing then reappearing, or perhaps changing colors while being observed. Specimens submitted for identification (often in great quantity) usually consist of bits of dead skin, hair, lint, and other debris. The individual's skin may have become irritated from persistent scratching, bathing, and application of ointments and lotions. Clothing and household items often are repeatedly washed, burned or discarded. Sufferers commonly have visited one or more doctors with no relief. While these cases may seem bizarre to pest managers, they are tragically real to the patient. Sufferers usually are convinced that spraying will fix the problem — but treatment of the disorder lies far outside the realm of pest control. Suspected cases should be left to health care professionals, mainly dermatologists and psychiatrists. Unfortunately, it is all but impossible to convince affected individuals to seek professional help, except perhaps by involving another family member.

CLOSING THOUGHTS. There is no simple way to handle a mystery bite investigation. Much of the time, pests will not be involved and relief lies outside the realm of pest control. Approaching each case in a thoughtful, methodical manner will increase the chances of finding a solution. Always remember that the bug-like sensations are real to the client, and should be handled with care and concern.

All photos appearing in this publication are courtesy of M.F. Potter



MYSTERY BITE

QUESTIONNAIRE AND INSPECTION CHECKLIST

1. Area(s) within building where bites are occurring _____

2. Number of people with symptoms _____
3. When did problem first occur? _____ Frequency of occurrence _____
4. Description of symptoms (welts, rash, itching, etc.) _____

Area(s) of body affected _____
5. Have patients seen a doctor (e.g., dermatologist)? If so, what was the diagnosis?

6. Have insects or mites suspected of causing irritation been seen or captured?
Identification: _____
7. Are pets present (dog, cat, parakeet, gerbil, hamster, mice, etc.)? _____
8. Has there been infestation of birds, bats, rodents, raccoons, squirrels, etc. within past 6 months? _____ If so, where? _____
9. Has the building been worked on recently (heating/cooling, ceiling, new carpet, paint, furnishings)? _____
10. Have affected persons been outdoors gardening, leaf raking, hiking or camping?

11. Have those affected been traveling, staying in hotels, or acquiring used beds or furnishings?

12. Is there any evidence of non-arthropod irritants? _____

