Mites (Arachnida: Acarina) Affecting Humans and Steps Taking for the Solution of Problematics

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Abstract

This article's goal is to introduce economically efficient, socially acceptable and environmentally benign strategies for controlling allergen producer mites. Mites can significantly impact human's setups because of annoying and uncomfortable bites which they inflict. Mites have variable life cycles and hosts, and some are public health pests causing irritation of skin due to bites or feeding on host's skin, fur and feathers; persistent dermatitis in response to invading skin or hair follicles; mite-induced allergies; transmission of pathogenic microbial agents and metazoan parasites; intermediate hosting of parasites, notably tapeworms; and invasion of respiratory passages and ears. There are only a few mite species that cause medical problems for human beings, but it is only itch mite which can be regarded as an important parasite of man, however, other mites may occasionally cause trouble. In particular the harvest mites (*Trombicula autumnalis*) of family Trombiculidae in their larval stage often bite peoples in late summer and cause intense irritation or a wheal, usually with severe itching and dermatitis, are called chiggers. Mites that cause allergy *Dermatophagoides pteronyssinus* (House dust mite) and invade skin and cause scabies (scabies mites *Sarcoptes scabiei*) are important pests of humans, but are not readily controlled through pest control methods. Certain other mites also invade skin or associated hair follicles and dermal glands, and are transmitted from person-to-person through direct contact. Pets, animals and birds that live around peoples surely carry around their own complement of parasitic mites transmissible to humans. Integrated Mite Management (IMM) has the potential to provide long-range and effective control with reduced reliance on pesticides. Community cooperation is required, however, because IMM often depends on structural modifications and sanitation performed by others. Customers must also support ongoing surveillance programs and often should tolerate slow-acting controls and occasional low-level pest sightings. Pest management personnel should educate, encourage, and convince potential customers through a comprehensive public relations effort. Read pesticide's label carefully and select products appropriate for use indoors or outdoors as needed for mites control.

Keywords: Acariasis, Mites of Animals, Mites of Livestock, Integrated Mite Management, Parasites

1. Introduction

There are several groups of arthropods that do not envenom their victims, but become pests by merely being present in homes or other locations inhabited by man and his domestic animals. Mites belong to the class Arachnid and the order Acarina that even though are very small, but important organisms to humans and other animals. There are thousands of mite species, the majority of which measure less than 1 mm in length. Like other arachnids, their bodies are comprised of the prosoma and abdomen, and mites bear four pairs of legs. Beginning as eggs,

these arachnids develop through larval and pupal stages prior to full maturation. Mite larvae have six legs and moult three or four times before the adult stage are reached. Although most mites are not harmful to animals, but some species are parasitic in nature. Some mites suck blood, while others are responsible for hypersensitive reactions. Mites that feed on animals and peoples can possibly cause skin irritation. However, there are many other causes for skin irritation, and a physician would be needed to determine the actual cause. Most species of mite are beneficial decomposers breaking down organic matter, allowing nutrients to be used by plants again. Even though most mites feed on organic matter, some mite species feed on plants while others have animal hosts. It is important to realize that mites that feed on plants, (spider mites, for example), cannot successfully feed and reproduce on human beings or other animals. Most mites that are animal parasites are fairly host specific only developing successfully on one species or group of animals that are closely related. While mites rarely transmit disease to humans, they definitely impact health in ways that range from simply being a nuisance when they enter homes in large numbers, to inflicting severe skin irritation that can cause intense itching (Bellido-Blasco et al., 2000; Sarwar; 2015a; 2015b). The most commonly encountered mites, including those that can adversely affect human health, are listed below.

1.1. Follicle mite *Demodex folliculorum* (Simon) Demodicidae

The follicle mite *Demodex folliculorum* is less than 0.4 mm long and usually escapes notice, and its developmental period is about 14.5 days .The follicle mites and related species are found in the sebaceous pores and hair follicles of man, especially around the nose, forehead, cheek, chin, eyelids, and also on other parts of the body. However, demodicids may inhabit follicles, with or without hair, anywhere on the body. The follicle mite can cause an inflammatory condition of the eyelids called demodex blepharitis. Many mites can be found clinging to or migrating about on extracted eyelashes that may be soggy or waterlogged, and sometimes can be pulled out with virtually no resistance. They occasionally are found in cysts on the face or when blackheads are squeezed out of the skin and examined with a compound microscope, demodicids can be identified by their cigar-shaped bodies and very short legs. These mites are entirely parasitic, and the entire life cycle being spent on the host animals, usually in the pustules. Demodicids have a curious body form, the long striate abdomen giving them a somewhat wormlike appearance and their legs are mere stumps. Inflammation and secondary infection often result when a large number of mites congregate in a single follicle. A Demodex type of acne rosacea or rosacea-like demodicidosis affecting the medial portion of the face is believed to result from excessive numbers of follicle mites. They have been found on many of adults examined in different surveys, while children and adolescents are seldom infested. Among adults, those with oily skin or who use cosmetics such as lubricating creams extravagantly and fail to cleanse the skin properly are the ones particularly subjected to infestation. The *Demodex folliculorum* infests hair follicles and *D. brevis* infests sebaceous glands, but both may be present on the same individual, however, *D. folliculorum* is the species that has received the most attention. Bacteria have been located on the bodies of *D. folliculorum*, suggesting the potential of this mite as a mechanical transmitter of disease germs (Axtell and Arends, 1990; Burns, 1992).
Demodex blepharitis should be treated early, so that the itching and scratching will not result in abscesses of the eyelids. The services of a physician should be obtained and anything that cleanses the mouth of the follicle reduces the number of mites. Vigorously rubbing with a cotton applicator moistened with warm water over the bases of emerging cilia, is to break apart the

collar of insulating debris over the follicle mouth, which can reduce the number of mites. The fastest and most direct method of treatment is for an ophthalmologist to apply ether to the lid margins, then after 5 or 10 minutes to apply ether or alcohol again for destroying the emerging mites. This treatment is repeated weekly for 3 weeks, along with a twice a day cleaning with cotton applicators, followed by appropriate ointments massaged into the lash margin. After thoroughly washing the face with soap and water, a prescribed ointment or cream can be rubbed in daily wherein it disappears rapidly following the topical application of a suitable ant parasitic medication. A compound polysulfide preparation, has given satisfactory results, and seldom causes irritation when kept away from the eyelids and neck. If ointment cannot be tolerated, a 0.5% selenium sulfide cream or an ointment of 10% sulfur and 5% balsam can be applied sparingly at night and washed off in the morning (Nutting et al., 1989; Bukva, 1990).

1.2. Clover Mites *Bryobia praetiosa*

The clover mite *Bryobia praetiosa* is a small measuring about $^{1}/_{32}$", adults are oval shaped, eight legged and about as small as the head of a pin. Clover mites can be red, green or brown in color, and have front legs that are about twice as long as compared to their other six legs and may be confused for the mite's antennae. Though they do not bite or cause health-related problems, clover mites can be a nuisance. This mite sometimes enters homes and other buildings in thousands, when their food plants are removed or dry up by causing panic among residents. Mite invasions are most common from vigorously-growing lawns and other vegetation surrounding homes, especially if shrubs are close to or touching the walls. The hot dry weather in the spring and early summer nay cause clover mites to migrate indoors. In the fall, the mites may also migrate indoors seeking shelter from low winter temperatures. There is some circumstantial evidence that suggests that applying too much nitrogen fertilizer may worsen clover mite problems and clover mites enter well-fertilized lawns. In attempting to remove the mites, homeowners often crush them, leaving red stains on furniture and drapes. Typical of many mite species, all clover mites are females capable of laying viable eggs without fertilization and they have no need for male mites (Fain et al., 1990; Halliday et al., 2000).

For control of clover mites, pest management professional should perform an inspection and use the inspection findings to prepare an integrated mite management plan for clover mite control. Professional may use his expertise and knowledge to recommend the application of effective and efficient chemical control measures to reduce the clover mite problem. A simple, non-chemical control method involves leaving a strip (12-18") of bare soil or gravel mulch around foundation walls. This plant-free zone discourages mites from migrating onto the walls and provides an area that can be easily treated if needed. If mites become a problem, application of a miticide to nearby foliage and lawns may be helpful. Insecticides like sevin, cyfluthrin, bifenthrin, and permethrin sold under a variety of brand names are examples of pesticides that are currently labeled for such use. Insecticides applied to foundation walls, door thresholds and window ledges make an excellent barrier. Indoors, the mites are easily killed with aerosol insecticide sprays, but vacuuming is a preferable alternative. However, this control program will likely include some helpful preventive measures the homeowner may choose to employ. Among these preventive measures are using a wet sponge or a crevice attachment of a vacuum cleaner to remove mites, making sure to take precautions to avoid crushing the mites and causing stains. Removing all grass and weeds from around the foundation perimeter and leaving vegetation free strip about two feet wide. This method is especially important on the south and southwest sides

of the structure. Clover mites are not as likely to move through bare, loose soil as they are through soil that is supporting plants that touch the structure's foundation. Sealing holes, cracks and gaps on the foundations, windows and doors, thus are helpful to discourage mites from entering the structure. Making sure not to over-fertilize the lawn or ornamental plant areas since clover mite populations tend to do better in lawns that are well fertilized (Michael and Lars, 2007).

1.3. House Dust Mites Dermatophagoides spp.

The most common species of house dust are *Dermatophagoides pteronyssinus* and *D. farinae* mites. Virtually invisible to the naked eye, the tiny house dust mites are most abundant in warm, humid areas. House dust mites do not bite or sting, however they may cause a skin reaction. They feed on dander, shed human skin scales that collect in the dust on furniture, particularly mattresses and on carpeting below beds, couches, and chairs where peoples spend significant time. It has been shown that, like cockroaches, dust mites and their feces can become airborne and are one of the most common indoor allergens. House dust mites are important medically because they produce allergens in their secretions and excrement. Inhaling airborne house dust containing mite feces and cast skins is a common cause of asthma in young children. But, unlike rodent mites, itch mites and chiggers, skin irritation is rarely caused by exposure to dust mites. Although they may get a lift on clothing, upholstered furniture, pillows and mattresses typically harbor more dust mites than carpeting (Colloff and Hart, 1992; Diaz, 2010).
The long-term solution to reducing a house dust mite problem is sanitation and environmental modifications. Vacuum possibly with a filtered vacuum cleaner frequently and thoroughly to remove mites and the organic debris on which they feed. Target critical areas are such as mattresses and bed frames rugs and carpets overstuffed furniture and the area underneath. Replace or clean air conditioner filters frequently and maintain less than 50% indoor humidity to reduce conditions favorable to dust mites. Encase mattresses and pillows in plastic covers, and change bed linen frequently to help prevent mite populations from building up. Products containing benzoyl benzoate and other ingredients are often used for severe infestations of house dust mites. Since dust mites can cause respiratory problems, avoid using insecticides that may further aggravate such conditions (Arlian and Hart, 1992; Friedrich and Elaine, 2007).

1.4. Straw itch mites *Pyemotes tritici*

Straw itch mites *Pyemotes tritici* also known as a hay or grain itch mite, measures $^{1}/_{125"}$, female bites an insect larva, person or animal, and utilizing this food, up to 300 eggs in the female's abdomen develop, and within a few days adult mites emerge from the pregnant female. Males breed with newly emerged females and this is the stage at which the mites disperse to colonize new habitats to feed on other insect larvae. The mites are actually beneficial because they attack insects that feed on stored grain and similar materials. These mites can cause red, raised itchy bumps on the skin during harvesting and post-harvesting operations or in straw, hay or certain grains. Bites produce a rash which includes red welts with a small white pustule (head) at the center. One to several hundred bites can occur on a person or animal, the bite is not felt and can take from two to 24 hours for resulting welts to appear. Severe cases can cause infection, fever, vomiting and joint pain. Severe itching and possible infection can occur if bites are scratched open. Itching may last up to a week or more and welts can normally disappear within a few

weeks. The bites of straw itch mites are characteristically found on the trunk of the body and on the arms. Straw itch mites commonly breed in stored grain, dried beans and peas, wheat straw, hay and other dried grasses. They are frequently a problem for peoples doing landscaping or feeding horses and other livestock or peoples who handle mite-infested materials can be attacked. When separated from their insect prey, itch mites may contact and bite other animals including humans, which may receive numerous bites leaving itchy red marks that can resemble a skin rash. Fortunately, the mites cannot live on humans, do not survive indoors, and are not known to transmit disease (Baker, 1999).

The best control strategy is to eliminate the mite's host insects, and if possible, clean storage areas thoroughly and treat with a pesticide, such as cyfluthrin, or if necessary, stored commodities can be fumigated to disinfest them. The selection of a chemical will depend on the intended use of the straw, for example, straw that is used for livestock bedding or feed should only be treated with a pesticide that is labeled for such use. To prevent straw itch mite bites, avoid grassy areas and shower with plenty of soap after being in grassy or weedy areas. An insect repellent is also another way of preventing the bites. Oral antihistamines such as diphenhydramine and topical anti-itch creams such as hydrocortisone consulting through physician have been useful in alleviating the discomfort caused by the bites (Jamaluddin, 2005).

1.5. Bird Mites *Ornithonyssus* spp., *Dermanyssus gallinae, Cheyletiella* spp.

Bird mites are ovoid in shape, bear short hairs on their bodies, eggs hatch in some species after three days and mature into adults within another five days. The northern fowl mite *Ornithonyssus sylviarum*, is a common pest of domestic fowl, pigeons, starlings, house sparrows and other wild birds commonly associated with peoples. Mite populations build up rapidly, a generation can be completed in 5 to 12 days, and several generations occur each year. Northern fowl mites spend virtually their entire life on the host bird. They can survive off a host for about a week or so. Mites that fall off host birds may be found wandering indoors. In poultry houses, they are sometimes found in the litter or on eggs, crates and cages. The *Cheyletiella* mites infest both birds and mammals and they may prey on other mites and insects living on the host's skin. The *Dermanyssus gallinae*, the chicken mite or red mite of poultry, is similar to the fowl mite in its host preferences. Unlike fowl mite, the chicken mite spends much of its time off the host bird, hiding in cracks and crevices during the day and feeding at night. They can survive for extended periods as much as 8 months off a host. It can be a serious problem to workers who handle birds. Around residences and other structures, mite problems tend to be more sporadic. Bird nests are often located in chimneys and tucked under eaves or window-mounted air conditioners. In the spring, nestling birds may be parasitized by thousands of mites. When the nestlings mature and leave their nest, mites may invade buildings in search of alternate hosts. Mites that normally infest birds also bite peoples and they can cause a mange-like condition in pets and itching in peoples, who handle infested pets, are capable of causing skin irritation in humans and they do not stay long on men (Pence et al., 1997).

Mites that find their way indoors are easily removed by vacuuming or can be killed with an aerosol insecticide. The key to reducing bird mite problems is to prevent the birds from nesting on or in structures and to remove abandoned nests quickly. To eradicate a bird mite population from the home, it is necessary to locate their breeding and nesting sites. Bird mites tend to reside within the nests of their hosts, so all such nests must be removed. While these wandering mites have been known to bite humans, they do not attempt to infest human hosts for long-term. Bird

mites are not capable of surviving for more than a few days, depending on species, without a food source (Jamaluddin, 2005).

1.6. Rodent Mites *Liponyssoides sanguineus, Laelaps echidnina, Ornithonyssus bacoti*

Rodent mites are commonly found in homes where rats and mice are plentiful. The life cycle of most rat mites is 14-21 days. Rodent mites may bite peoples when their hosts die or abandon their nests and migrate in search of a new host. Rodent mites do not stay on humans for long time, they tend to drop off after feeding and hide near beds, couches and other human resting places. Diseases carried by rodents can also be spread to humans through mites that have fed on an infected rodent, whereas the signs and symptoms are itchy rashes, tiny clear blisters, painful lesions Three types of rodent mites readily bite humans, the house mouse mite *Liponyssoides saguineus*, spiny rat mite *Laelaps echidnina* and tropical rat mite *Ornithonyssus bacoti*. The house mouse mite prefers to suck the blood of mice, but also will bite rats and peoples, often causing a rash around the bite. The spiny rat mite feeds on rats at night and hides by day in cracks and crevices around rat nests and resting places. The tropical rat mite's bite is painful and causes skin irritation and itching (Barnard and Durden, 1999).
Rodent mites do not stay on humans long. They tend to drop off after feeding and hide near beds, couches and other human resting places. They may also congregate around heat sources such as stoves and hot pipes. Parasitic arthropods absorb air through pores called sphericals, so, the aroma of cedar oil triggers an instant danger response, forcing the mite to close its breathing pores. Unless the source of the mites is removed, they can continue to seek human hosts and the home may remain infested. Search basements, attics, ceilings and walls for dead rats, mice and abandoned nests. Nesting areas may also require application of appropriate pesticides, applied according to laws and labels, to ensure removal of bird mite populations. Repair of creases in walls, eaves and ledges may discourage further nest building. These procedures should be undertaken on a regular basis to ensure effectiveness. In controlling bird mites around homes, the removal of bird nests is the most important step. It is important to follow state and governmental regulations, however, since some bird species are protected and actions may be limited. Areas surrounding identified breeding sites should be inspected for additional nests, as well. Following the disposal of all infested nests, insecticide treatments, applied according to the label, may be applied to treat visible specimens (Arlian et al., 1994).

1.7. Chiggers Eutrombicula spp.

Chiggers measure 0.2-0.4 mm or $^{1}/_{100"}$, red in color, and are the juvenile form (larvae have six legs while the adult forms have eight legs) of a certain type of mite of the family Trombiculidae among arachnids. Chiggers are unique among mites affecting humans and animals in that the immature stage (the larva) is the only parasitic stage. The chigger mite and the juvenile (biting) forms require a relatively humid environment, so they are most commonly located in vegetation that is near ground level like grassy fields, gardens, parks and in moist areas around lakes or rivers. When human skin or clothing comes in contact with low-lying vegetation that hosts chiggers, the mites can infest the human and migrate on human skin in search of a feeding area. The bites commonly cause itching in about 3 to 6 hours and dermatitis develops in about 10 to 16 hours. Some peoples experience allergic reactions to the bites and develop blister-like lesions (Smith et al., 1998).

Two species of chigger mites attacking humans and other mammals, birds and reptiles are the hard biting *Trombicula alfreddugesi* and the most prevalent chigger called the harvest mite, is *Trombicula autumnalis*. The *Eutombicula alfreddugesi* are very small, reddish mites that feed only in the larval stage on humans and other animals, particularly rodents. The red color of the larvae is not blood but a natural red pigment. Chigger larvae are red to yellow in color and appear as scarcely visible specks. When they detect the carbon dioxide exhaled by an animal, they climb on soil or vegetation and wave their front legs to contact it, and then grasp it with their mouthparts. They do not suck blood, but cut into the skin, inject skin-digesting saliva and suck up the liquefied skin. If not dislodged, the chigger will feed for several days. The bite becomes inflamed, hardens and itches. Chiggers have tiny claws that allow them to attach tightly to peoples and animals. Once attached, a chigger pierces the skin and injects its saliva, which contains digestive juices that dissolve skin cells and the chigger eats the dissolved cells. After a couple of days the chigger falls off, leaving a red bump on the skin. Chigger bites start to itch within hours of the chigger attaching to the skin. Chiggers most commonly bite in areas of thinned skin such as wrinkles and folds. Therefore, chigger bites are commonly observed in the crotch and groin areas, in the armpits, and in the folds behind the knees. The ankles are also a common site for chigger bites. Other areas that are commonly bitten by chiggers are areas where the clothing fits tightly to bite skin (such as belts, along sock tops,) presents barriers to their migration. Skin begins to itch approximately 1-3 hours after being bitten by chigger larvae and can eventually develop itchy, red or puss filled bumps at the site of attachment which can be extremely irritating. Chigger bites are itchy red bumps that can look like pimples, blisters, or small hives. They are usually found around the waist, ankles, or in warm skin folds. They get bigger and itchier over several days, and often appear in groups. The itching persists for up to a week, and complete healing of the skin lesions can take up to 2 weeks. The itch stops after a few days, and the red bumps heal over 1-2 weeks. Some men who have chigger bites on the penis develop a reaction known as ‘summer penile syndrome’. This can cause swelling of the penis, itching, and painful urination (Ho and Fauziah, 1993; Shatrov and Kudryashova, 2008).
Place a piece of black cardboard edgewise on the ground and observe it for a few minutes. If chiggers are present, they will climb to the top edge and congregate there. Make this test in 8 to 12 spots over the area. Chigger’s treatments include home remedies to combat itching as well as over-the-counter medications. Chigger bites can be prevented by using insect repellants, washing clothing worn outside in hot water and avoiding areas favorable for chiggers, such as low-lying vegetation near a humid source. The itching can be alleviated through use of topical corticosteroids and antihistamines. Hot showers or baths also will help reduce itching. In cases of severe dermatitis or secondary infection associated with chigger bites, a physician should be consulted (Baumann, 2001).

1.8. Scabies Mites *Sarcoptes scabiei*

Scabies are caused by the microscopic mite *Sarcoptes scabei* var. *hominis*, adult females are 0.33 to 0.45 mm long, and the males 0.20 to 0.24 mm. The mites are a translucent, dirty-white in color, with the more highly chitinized (shell or nail like composition) portions brownish. Scabies mites infest and prefer certain parts of the body such as the skin between the fingers, the bend of the elbow and knee, the breasts, the penis and the shoulder blades, but not found above the neck. Apparently, newly infected persons experience no itching, so an infestation may progress extensively before being noticed. This usually occurs at night and is caused by toxic secretions

and excretions directly associated with burrowing by the mite. Skin scratching may cause secondary infection and helps the mites to spread. The mites are transmitted by person-to-person contact, or by coming in contact with bedding, towels, or articles of clothing used by an infested individual. The fertilized female mite deposits oval eggs at intervals in the tunnel it makes in the upper skin layer (epidermis) and usually remains in the tunnel for lifetime, depositing eggs at 2 to 3 day intervals for a 2 months period. Larvae hatch in 3 to 5 days and move freely over the skin, and these and nymphs often are found in hair follicles. Within 4 to 6 days after egg hatch, the nymph transforms into a male or an immature female. The female makes a temporary burrow in the skin before mating and lays eggs in tunnels. The eggs hatch into six-legged larvae which become eight legged nymphs and finally adult males and females. The mites are believed to feed on skin and secretions and the entire life cycle of 10-17 days is spent on their host. Scabies mites occur most commonly in tiny papules, particularly in webbing between the fingers and folds of the wrists on the front of the wrists, the sides and webs of the fingers, the buttocks, the genitals and the feet. Positive identification is made by excising a tiny bit of flesh, treating it with ten percent NaOH or KOH solution, and examining the tissue on a slide with a good compound microscope (Menzano et al., 2004; Chosidow, 2006).

1.8.1. Diagnosis and Treatment

When anyone suspects an infestation of the mite, skin scrapings from the affected area should be taken by a physician or dermatologist and analyzed, and without this analysis, scabies cannot be accurately diagnosed. Once an infestation is positively diagnosed as scabies, it is desirable to use an insecticide ointment as directed and should be handled carefully. Besides insecticide treatment of the body below the neck, clothing and bedding should be washed in hot water (125 degrees ^{o}F). However, since these may feed for hours, or even days, taking a warm shower when bites are first noticed can disrupt further feeding by washing away any remaining mites. Severe allergic reactions should be seen by a medical professional, but less severe reactions can be treated with skin care ointments (Jamaluddin, 2005).

1.8.2. Skin Care

A person may not know that he has been attacked by scabies mite until welts appear and itching begins. Take a bath as soon as possible upon returning from a mite infested area. Apply a thick lather, rinse and then repeat. This action kills most attached mites and ones not yet attached. Next, apply an antiseptic to the welts; this kills any remaining mites and prevents infection. Destroying the mites reduces the itching, but does not stop it. The fluid injected by the mites causes the itching, and no practical way to remove it has been found. For temporary relief of itching, apply ointments that contain benzocaine, hydrocortisone, or those used for relief of poison ivy itching (Friedrich and Elaine, 2007).

1.8.3. Preventive Control of Mites

Before going into a place where mites may be present, protect yourself with a repellent. Look for the active ingredient N, N,-diethyl-m-toluamide and apply the repellent to clothing by rubbing or spraying on it. Do not saturate the cloth with repellent as some kinds of rayon and other synthetic fabrics may be damaged by the repellents, so use caution; but nylon, cotton and wool will not be

harmed. In treating clothing, apply repellent along the inside and outside edges of all openings, such as cuffs, neck and waistband areas. Be sure to treat all the way around the upper edges of socks. Cotton and wool socks absorb repellent better than other materials. Apply the repellent lightly to the arms or legs if they are not covered by clothing, and read the label for specific instructions and cautions (Jamaluddin, 2005).

1.9. The Grain and Flour Mites

The grain and flour mites (Family Acaridae or Tyroglyphidae) are tiny, pale-gray or yellowish white with conspicuous long hairs. The first two pairs of legs are widely separated from the third and fourth pairs of legs. They feed on a wide variety of organic materials, may become very common in leaf, mould, flour, hair, mattresses and similar substances. The family Acaridae contains species best known as pests of stored food products, but some species also cause dermatitis in peoples handling infested commodities, as well as causing inhalant allergy or bronchial asthma. The mite *Acarus siro* L. causes a rash known as vanillism in vanillapod handlers, while *Tyrophagus castellani* (Hirst) causes copra itch among workers handling copra and a dermatitis in peoples who handle cheese. In the family Glycyphagidae *Glycyphagus domesticus* (De Geer) causes grocer's itch in workers handling dried fruits, skins and other heavily infested products. Allergen from *Glycyphagus destructor* (Schrank) has been found in chaff. Allergen obtained from *G. destructor* differs materially from that of the house dust mites *Dermatophagoides pteronyssinus* and *D. farinae*, whereas the allergens of the latter both species are identical (Mullen and OConnor, 2002).
After mattresses are vacuum-cleaned, there is an 8-fold reduction in the number of mites that became airborne during bed making. Dead mites and mite excreta possess as much allergen as live mites, and vacuum-cleaning is necessary after the mites are killed. Ultraviolet radiation for 2 hours almost can completely remove the allergen. Mattresses appear to be the reservoirs from which bedroom floors are re-infested by grain mites for a brief period during the year. The mites apparently live only in the surface layer of the mattress. It is reasonable to expect that control of mites in bedrooms inhabited by persons who are allergic to dust mites may be accomplished by preventing penetration of moisture and accumulation of food in the upper few centimeters of the mattress, as with the aid of a plastic sheet. Also, the application of fungicides to eliminate microorganisms that are essential to the mites appears to be a promising approach. It is recommended that environmental mite control should always be attempted in the home of an allergic person before hyposensitization. Feather and kapok pillows and eiderdowns should be removed. Blankets should be dry-cleaned, and the linen washed whenever possible. At least once a week, the house should be vacuumed and the bedroom more often, paying special attention to cracks and crevices. It is suggested ventilation, vacuum-cleaning, dusting of 1% lindane dust into cracks and crevices, and if an acaricide are used, remove all dead mites, cast skins and fecal pellets (Gorham, 199l).

1.10. Oak leaf itch mite

The mite *Pyemotes herfsi*, a close relative of the straw itch mite *Pyemotes tritici*, is nearly invisible to the naked eye (0.2 mm in length). They are elongated, reddish tan in color and have a shiny exoskeleton. The species *P. herfsi* attacks insects living in sheltered locations, including the larvae of midges (gnat-like flies) in leaf galls and the eggs of cicadas beneath tree bark. The

oak leaf itch mite has also been reported from stored products and grains where they feed on various stored products pests, and from the galleries of wood boring beetles in the families Scolytidae and Anobiidae. The fertilized female mites attack the larvae of the gall, paralyzing it with venom and fertilized female then feeds on the prey and remains attached until its offspring emerge. The adult males emerge from the abdomen of their mother in advance of the females and mate with the adult females as they then emerge. After mating, the males die and having never fed. The mated females then find a gall and enter (probably) through the small openings at the ends of the folded margin of the gall (a fly midge in the family Cecidiomyiidae). Generational time span is just one week, so the mites can become numerous in a short period of time. One tiny female mite carries 250 young to adulthood inside her distended abdomen at one time. Depending on the number of mites per leaf and how many infested leaves are on a tree, a tree could shed mites on anyone if walks under an oak tree during a hatch, and probably be bitten. If a person is rolling on the grass where the wind has carried the mites, he might be bitten. If anyone is downwind of that oak tree driving by with open windows, jogging, or just sitting in reading chair behind a screened, open of window in home may could be bitten (Robinson, 1996; Arroyo et al., 2015).

This mite can produce a pruritic (itchy) rash that is often erythematous (a redness of the skin) and papular (with small, raised, pimple-like bumps). Although they have been reported to feed upon many different insects, it is when they have become very numerous, eliminated their current food source, then they will search for alternative hosts and inadvertently bite humans. Oak tree mites bring chigger-like bite and bites of mite usually show up around the legs, sock line or belt line, neck, face, chest and arms. The bite is itchy and can be become painful but is not a problem unless secondary infection occurs. Treatment includes topical anti-itch cream or lotion and orally taking Benadryl or Zyrtec. For avoidance**,** use insect repellent with DEET, wear long pants, socks, hats, long-sleeved shirts, and shower and launder clothes immediately as soon as go inside. The first, best measure is to avoid being bitten that means avoiding stands of oak trees particularly pin oak and others in the red oak family until after the first hard frost. Little can be done, when mites are protected from sprays while inside the galls, and trying to treat trees and lawns is a waste of money as they are protected inside the leaf gall (Gagne, 1987; Staley et al., 1994).

1.11. Paper Mites and Other Unidentified Bites

Complaints about bites and rashes for which a specific cause cannot be found are often attributed to so-called paper mites or to one of the other mites mentioned above, particularly scabies and bird mites. Although mites are extremely small, they are usually detectable with the unaided eye as in the case of bird mites, or by skin scrapings or biopsy or other samples collected and examined by a physician. In the case of scabies and straw itch mites, the rash or bites caused by these mites help in identifying them as the cause of the problem. However, bit marks (or presumed bite marks) are not entirely reliable on their own to confirm the cause of the problem. Very often persons unconsciously and repeatedly scratch irritated areas of the skin (particularly at night while sleeping) and this will only worsen the condition. Bird mites, black pepper mites and paper mites are often used as reasons to justify pesticide treatments in homes and offices. Pesticide applications made without first identifying a specific pest problem (and target application site) are usually ineffective and should not be used. More importantly, repeated and widespread pesticide applications are potentially hazardous to men and the animals around. This

includes constant (and multiple) applications of insect repellents and other insecticides to skin (which can cause rashes and irritation), clothing and bedding. It is needed to identify the cause of a problem before resort to spraying any pesticides in homes and offices (Walter and Proctor, 1999).

When mites attach to skin, the saliva they secrete causes the intense itch that may be felt for several days after the mite is no longer attached. As soon as possible after walking through chigger-infested areas or being exposed to other mites, person should bathe in hot, soapy water and scrub down with a wash cloth. Oral antihistamines and application of a hydrocortisone cream to bites may help to relieve itching, and in a severe reaction, consult to the physician (Parcell et al., 2013).

2. Managing of Mites

The first step in determining the true cause of irritations that may involve mites is to thoroughly inspect the premises and identify any organisms discovered. The simple fact that all mites are tiny creatures, some are so small they can be seen only with magnification, often makes inspection and identification difficult. Likewise, mites that affect humans are a diverse group, each with very different habits, all of which investigators should be aware. Seek medical attention when exposure to mites is suspected as the cause of skin irritation. This is certainly true in the case of scabies infestations that will require medication. In addition, bedding and clothing of scabies-infected persons should be washed regularly. When mites have been identified, appropriate control measures can be employed. A vacuum sweeper can be a valuable weapon in the mite control arsenal. Infestations of clover mites, rodent and bird mites in and around structures can sometimes be eliminated by vacuuming alone. Vacuuming may be less effective, but still of value, in controlling various food mites, straw itch mites and dust mites. Note that dust mites are not prevalent in ductwork; therefore, duct cleaning is not recommended for dust mite control. However, a high-efficiency particulate air filter can be installed to help prevent airborne allergens, including dust mite particles (Bates, 1999).

Moisture control also can be important. Mites transfer air and water through their body walls and are subjected to desiccation at low humidity. Dust mite populations, for example, suffer when a relative humidity of 50 percent or less is maintained. On the other hand, high humidity can cause mite populations to increase exponentially. Well-ventilated homes in dry climates contain few dust mites. Homes with a relative humidity that consistently rises above 50 percent can contain more than 100 dust mites per gram of dust. To reduce dust mite numbers, a relative humidity of less than 50 percent must be maintained for several weeks. Any fluctuation in humidity, however brief, seems sufficient for dust mites to remain and reproduce. Daily activities such as air-conditioning and showering can cause humidity levels to fluctuate in portions of the home. Thus, other means of controlling dust mites should also be employed in addition to humidity control (Owen et al., 1990).

For mites, products containing benzyl benzoate, and possibly abrasive dust formulations, may provide some control when applied to flooring and floor coverings. Bedding, draperies, floor coverings and furniture should be cleaned regularly. Pillows, mattresses and upholstered furniture can be discarded or sealed in plastic covers to help prevent dust mite infestation, and to reduce ongoing infestations and their associated allergens. Persons suffering from allergic reactions or asthma should consult a physician (Friedrich and Elaine, 2007).

Exclusion methods also can be used for certain mites e.g., clover mites. Structural entry points e.g., gaps in and around foundations, doors, windows, vents, utility lines, etc., should be sealed. This will help to keep clover mites outdoors along with rats, mice, birds and the mites these pests bring when they are allowed to nest in structures. If nests are found, they should be removed and the area around them vacuumed. Other non-chemical methods include maintaining a plant-free border around foundations and reducing the amount of fertilizer applied to lawns both of which help to keep clover mites away from structures. Pesticides labeled for use against mites, known as miticides or acaricides, can be effective against clover mites and chiggers in grassy areas. For chiggers, however, insect repellents containing 7 percent to 30 percent 'DEET' should be used as the first line of defense. To dislodge any chiggers that may have attached, take a hot, soapy bath or shower immediately after visiting natural areas where chiggers are present (Woolley, 1987).

3. Integrated Mite Management

Integrated Mite Management provides tools to develop control programs for agriculture including management of plant-feeding mites, and mites attacking stored products, bees and livestock. Emphasizing on the biology, ecology, behavior and diverse methods of controlling mites, this article provides an overview of the management of medically important mites using all available Integrated Mite Management (IMM) tools, including biological control, cultural practices, sanitation and pesticides. Spray carpets, couches and beds with soft insecticide, and vacuum daily for at least for ten days because rodent mites can live away from a host for up to ten days. If householders do not intend to spray carpets with a quality miticide, after vacuuming, be sure to discard or freeze the vacuum bag as mites can easily escape the bag and re-infest home. For chronic or severe infestations, it is recommend the use of commercially avaiable dry fog machine. The low molecular weight of a good dry fog will penetrate to unseen cracks and crevices that is better than spot treatments with a spray bottle (Hoy, 2011, Sarwar, 2015c).

4. Conclusion

The fall season brings fall allergies for many peoples, but recently there has been something else floating including mites, which are microscopic that fall from trees and land on just about anything like grass or in this case peoples. A lot of peoples do not notice that they are bitten by mites because the bites are not so big and swollen and inflamed. Typically, the bite creates an itchy, red mark and surrounding rash that may expand a few centimeters, and sometimes the bite location develops a small pustule. Cats and dogs can also be infested by mites, because animals have a variable reaction to mite infestations, while, some animals may not show signs of a mite infestation. Sometimes mites can move off pets and feed on humans and cause itching or biting sensations. Persons who have itching or biting sensations and a pet in the house should have their animal checked for mites by a veterinarian. Treatment of the animal may solve the itching or biting sensations on the pet owner, but if there are no pets, consult a dermatologist for the cause of the dermatitis. Mites and other ectoparasites abandon animals very quickly once the host dies and seek out other warm-blooded animals even if they are not suitable hosts. Mite invasions accompanied by biting sensations are sometimes associated with pigeons and other birds that flock or roost around homes. Bird control is the best approach in controlling of these mite infestations. Using of gloves or a shovel when handling dead animals can also make a good common sense.

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