



# FactSheet

**Extension**

## Ohio State University Extension Fact Sheet

### Entomology

1991 Kenny Road, Columbus, OH 43210-1000

## House Dust Mites

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Common Name	Scientific Name
North American House Dust Mite	<i>Dermatophagoides farinae</i> Hughes
European House Dust Mite	<i>Dermatophagoides pteronyssinus</i> (Trouessart)

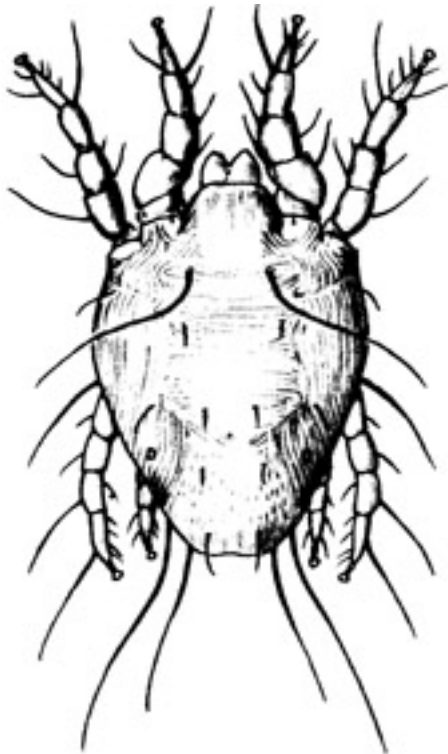
One of the most strongly allergenic materials found indoors is house dust, often heavily contaminated with the fecal pellets and cast skins of House Dust Mites. Estimates are that dust mites may be a factor in 50 to 80 percent of asthmatics, as well as in countless cases of eczema, hay fever and other allergic ailments. Common causes of allergy include house dust mites, cat dander, cockroach droppings and grass pollen. Symptoms are usually respiratory in nature (sneezing, itching, watery eyes, wheezing, etc.), usually NOT A RASH. However, there are reports of a red rash around the neck. Other allergic reactions may include headaches, fatigue and depression.

The wheeze-inducing proteins are digestive juices from the mite gut which are quite potent. An exposure to the mites in the first, crucial year of life can trigger a lifelong allergy. There is no cure, only prevention. One must control house dust mite levels.

Beds are a prime habitat (where 1/3 of life occurs). A typical used mattress may have anywhere from 100,000 to 10 million mites inside. (Ten percent of the weight of a two year old pillow can be composed of dead mites and their droppings.) Mites prefer warm, moist surroundings such as the inside of a mattress when someone is on it. A favorite food is dander (both human and animal skin flakes). Humans shed about 1/5 ounce of dander (dead skin) each week. About 80 percent of the material seen floating in a sunbeam is actually skin flakes. Also, bedroom carpeting and household upholstery support high mite populations.

## Identification

House dust mites, due to their very small size (250 to 300 microns in length) and translucent bodies, are not visible to the unaided eye. For accurate identification, one needs at least 10X magnification. The adult mite's cuticle (covering) has simple striations that can be seen from both the dorsal (top) view and from the ventral (bottom) view. The ventral view of the house dust mite reveals long setae (hairs) extending from the outer margins of the body and shorter setae on the rest of the body. Through the microscope, one will see many oval-shaped mites scuttling around and over one another. There are eight hairy legs, no eyes, no antennae, a mouthpart group in front of the body (resembles head) and a tough, translucent shell, giving a "fearsome appearance."



## Biology and Life Cycle

Adult females lay up to 40 to 80 eggs singly or in small groups of three to five. After eggs hatch, a six-legged larva emerges. After the first molt, an eight-legged nymph appears. After two nymphal stages

occur, an eight-legged adult emerges. The life cycle from egg to adult is about one month with the adult living an additional one to three months.

The diet is varied with the primary food source, consisting of dander (skin scales) from humans and animals. However, needed nutrients can be provided from fish food flakes, pet food, fungi, cereals, crumbs, etc. Many mite species live in bird's nests, in barns, among stored grain, straw, etc.

House dust mites are cosmopolitan in distribution with much of the research previously done in Europe.

One of the major limiting factors in mite survival and population development is the availability of water for sorption. Highest mite densities occur in the humid summer months and lowest in drier winter periods. Dust mite populations are highest in humid regions and lowest in areas of high altitude and/or dry climates.

Due to the large quantity of skin scales sloughed off daily by humans, mites have an abundant food supply. Dust mite antigen levels are measured in bed dust, floor dust, and room air samples. Detection in room air was best during cleaning and bed-making activities.

## **Control Measures**

House dust mite presence is often suspected before they are actually seen and accurately identified. Requests for control often come from individuals who have been diagnosed by medical personnel as allergic to the house dust mite or the allergens produced.

## **Detection**

The presence of house dust mites can be confirmed microscopically which requires collecting samples from mattresses, couches or carpets. Also, it requires the use of a microscope with sufficient magnification and the technical ability to recognize house dust mites under the microscope.

Another diagnostic test known as "Acarex" is sold and distributed by Fisons in the United States. This is a "dipstick-type" test similar to those sold in drugstores for glucose, etc. The test actually detects the presence of house dust mite feces.

One must collect dust samples and mix a portion of the sample with reagents packed with the test. One then places the dipstick into the mixture, removes it, and compares the color change to a chart packed with the test. It will give an indication of the level of infestation. Keep test kits refrigerated. Contact drugstores and specialty shops dealing with water and air purification systems and related environmental control for the diagnostic kit.

## **Sanitation**

Recommendations focus on "dust control." One must reduce the concentration of dust borne allergens in the living environment by controlling both allergen production and the dust which serves to transport it. For the bedroom environment:

1. Replace feather and down pillows with those having synthetic fillings.
2. Enclose the mattress top and sides with a plastic cover, thoroughly vacuuming mattress pillows and the base of the bed.
3. Daily damp dust the plastic mattress cover.
4. Weekly change and wash pillowcases, sheets, and under blankets, and vacuum the bed base and around the covered mattress.
5. Replace woolen blankets with nylon or cotton cellulose ones.
6. Frequently wash all bedding (blankets, mattress pads and comforters) in hot water (130 degrees F weekly). Also wash curtains.
7. Remove carpet and replace with wood, tile, linoleum, or vinyl floor covering. (If you have carpet, vacuum every day.)
8. Mattresses covered with "fitted sheets" help prevent the accumulation of human skin scales on the surface (an alternate to encasing mattresses and box springs in non-allergenic, impermeable, plastic covers).

The application of frequent vacuuming as a dust control measure is more likely to aggravate allergic asthmatic conditions because conventional vacuums are very "inefficient." Dust collection by conventional vacuums results in a significant increase in air borne dust concentrations. Vacuuming is best accomplished by cleaners that entrain dust into a "liquid medium" such as water (rather than a dust bag), which reduces the suspension and dissemination of allergenic dust particles in the air. Some pest control firms sell air purifiers to eliminate the food source of house dust mites. Air purifiers emit a low level of ozone (activated oxygen). Ozone attaches to fungus, mold, and bacteria on skin flakes. Machines sell for around \$625 and last up to 15 years. About the size of a bread box, an area up to 2,500 square feet is protected. There is no maintenance required other than a thorough cleaning once every three to four months. The air purifier is placed near a return for air conditioning or heating system or centrally located within the home.

Various types of air purifiers can be attached to the central air return to decrease irritants. Most filters remove 50 to 70 percent of material. HEPA filters will remove up to 99 percent of the material. Indoor air quality is very important. (One needs to bring in fresh outside air rather than recirculating dirty air.) Some filters need to be changed monthly.

Some feel it is important to focus on decreasing indoor humidity, especially during the winter period to reduce dust mite populations. One might forsake humidifier use during winter periods, use of dehumidifiers during high-humidity periods, or use of central air conditioning. Effective control of mites would require the maintenance of relative humidities below 50 percent (mites thrive in humid conditions).

Homes that have their air conditioners on constantly have lower mite counts than non-air conditioned homes.

## Chemical Control

No pesticides are currently labeled for house dust mites. However, two non-pesticide products, Acarosan and Allergy Control Solution are available for treatment of house dust mites and their allergens. The active ingredient of each is benzyl benzoate and tannic acid. Benzoic acid esters, such as benzyl benzoate, are very effective acaricides in both laboratory and field evaluations. Health risks appear to be slight as benzoates are rapidly metabolized in the body to hippuric acid, which is excreted in the urine. Most acaricidal studies for house dust mite control have been done in Europe. Before pesticide recommendations are made in the United States, approval will be needed by the Environmental Protection Agency (EPA). For additional information, telephone 1-800-7ASTHMA.

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