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House dust mites

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ÖZET

Ev tozu akarları dünyanın bir çok yerinde evlerde özellikle yatak odalarında ve mobilya aralarında bulunmaktadır. Akarlar deri döküntüleri ile beslenir ve bazı insanlarda allerjik hastalıklara neden olurlar. Ev tozu akarlarının ve artıklarının alerjik rinitis, astım ve atopik dermatitis'in en önemli nedenlerinden birisi olması dolayısıyla bu akarların medikal ve ekonomik önemleri, biyolojileri, tespitleri ve kontrolleri en son literatürler taranarak bu derlemede özetlenmiştir.

Anahtar Kelimeler : *Ev tozu akarları*

SUMMARY

House dust mites are found in human housing, particularly in bedding and furniture in many parts of world. It feeds on epidermal flakes shied from human skin and, some humans become allergic disease. Because of the fact that house dust mites and their dropping are the most important causative of the allergic rhinitis, asthma and atopic dermatitis world wide. Medical and economical importance, taxonomy, biology, description, detection, control of such mites are reviewed in the light of recent literature.

Key Words : *House dust mites.*

There is significant increase in allergic diseases now. Allergic diseases have been found in respiratory tract and skin and the reason of allergy depends on many factors including house dust (1, 2).

Allergic diseases are called as a structure which is IgE and be formed by this antibodies. The environmental factors have importance IgE producing. IgE antibodies are synthesised as a response from specific antigenic stimulation from B lymphocyte and plasma cells. IgE molecules hold of surface mast and basophyl cells and cause to sensibile and be increasing to Ca permeability into this cells at the finally (1, 2).

The major of two allergic diseases such as allergic rhinitis and bronchial asthma have been occurred by pollens, molds, bird feathers, animal hairy, cotton, wood, silk, textile fibbers and house dusts (2).

This dusts are heterogen forms, and contain certain allergens. The allergens in house dusts are found two form such as organic and inorganic allergens (2).

The inorganic allergens; have been occurred by using of furnuture, due to their cellulose fibre which damaged physically and chemically.

The organic allergens; have been occurred by house dust mites called major allergens.

Few people nowadays have not seen a television programme about house dust mites. Newspaper are full of advertisements for things which are supposed to help you get rid of them and the nasty dust they live all over your house.

The term "house dust mites" has been applied to a large number of mites found in association with dust in dwellings. The American house dust mite, Dermatophagoides farinae Hughes, and the Eu-

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ropean house dust mite, Dermatophagoides pteronyssinus, are discussed here. The first permanent structures for houses date back to 6,000 to 5,000 B.C., but it was not until the late 1600s that scientist became interested in the dust of houses (1-3). The pyroglyphids are parasites associated with birds and/ or mammals Kern (4), found house dust to give positive cutaneous reactions in sensitive patients Cook (5), also found that dust extracts gave positive skin reactions in over 30 per cent of the individuals tested .

TAXONOMY

The most common genus of mites found in house dust in North America and Europe is Dermatophagoides, of which there are two species, D. pteronyssinus and D. farinae are classified as; (6, 7).

Phylum : Artropoda
Subphylum : Chelicerata
Class: Arachnoidea
Order : Acarina
Suborder : Acaridida
Family : Pyroglyphidae
Genus: Dermatophagoides
Species: Dermatophagoides pteronyssinus
Species: Dermatophagoides farinae

DESCRIPTION

Both male and female adult house dust mites are globular in shape, creamy white and have a striated cuticle. The female measure approximately 420 microns in length and 320 microns in width. The male is approximately 420 microns long and 245 microns wide. A pair of suckers on the ventral posterior idiosoma of the male is used to grasp the female during copulation. Males are more sclerotized with enlarged legs I and III. The male aedeagus is located between the apodemes of leg IV. The female has a well-defined genital opening anterior to the bursa copulatrix located near the anus. Their body parts and fecal excreta are initially 10 to 50 um in diameter but break down into smaller fragments that become airborne when dust is disturbed. According to one study, more than half of the weight of mite allergens within a home were found to be less than 5 um in length. Their fecal material are the primary health concern since they can be inhaled into the lower airways of the lungs (6, 7).

LIFE STAGES AND BIOLOGY

Distribution	:	Nearly cosmopolitan in distribution; associated with house dust and bird nests.
Hosts	:	Mammals, particularly man, and in bird nests, and occasionally in bee hives.
Lifespan	:	up to tree months; (tree larval stages)
Reproduction	:	Female mites lay about 25 to 50 eggs before they die.
Habitat	:	They live in carpet, fabric upholstery and matters.
Diet	:	Human skin scale, animal dander and trace nutrients.
Allergens	:	Dust mite fecal material.
Living Conditions	:	-95 F (15 C – 35 C) relative humidity (8- 10).

The life cycle of these two mite species include egg, active larva, resting larva (pharate tritonymph), active tritonymph, resting tritonymph (pharate adult), and active adult. Between 19 and 30 days are needed to complete a life cycle depending upon the temperature and humidity (9). Mated females live about two months. A male may attach itself to a tritonymph female and mate when she reaches the adult stage. D. farinae lays eggs over a 30-day period, producing about an egg a day, while D. pteronyssinus lays about 80 eggs over a 45-day period. There is a general agreement that house dust mites in the home feed on shed skin of man. The average individual sheds 0.5 to 1.0 gram of skin daily. Muray ve ark (9), reported that the mites were sensitive to relative humidity and at 60 % or lower the mite population stops growing and dies out.

SURVEY AND DETECTION

Vacuum mattresses, carpets, sofas, and chairs and examine the dust collected for mites. A number of complicated procedures have been published for separating mites from the dust. A simple method for detecting the presence of mite is to put a small amount of dust on the surface of water and examine it under 20X magnification. Live and dead mites will remain on the surface of the water. Hirschmann (11), reported a sieving and flotation technique. Budak (12), placed a 0.05g sample of dust in 30 ml of a saturated NaCl solution and added 5 drops of de-

tergent. The dust was teased apart and subjected to ultrasonic treatment for 20 minutes. The suspension was rinsed through a 45 micron mesh sieve, stained with crystal violet and examined under a stereo microscope. Hirschmann (11), reported that dust mites were attracted to white DIN-A4 sheets of typewriter paper placed where the dust mites are suspected. Paper is examined in the mornings and evenings by holding the paper over a lamp. The mites cast a shadow.

For collecting house dust mites, dust samples are removed from mattresses and settees with a small portable vacuum-cleaner to which is attached a small polyethylene sampling tube (measuring about 7.5 x 2.5 cm). On completion of sampling, the tubes are tightly closed. In the laboratory the dust is shaken out into a Petri dish and examined under a dissecting microscope at x40 magnification. After removing the live mites, for preservation or use in rearing, the dead mites are collected by covering the dust sample in the Petri dish with 90 % lactic acid and placing the dish at 50°C for one to two days. The sample is then mixed with distilled water and centrifuged for five minutes at 2000 rpm. The supernatant fluid is removed and examined for dead mites (11).

Mites can be preserved for short periods (up to three months) in 70% alcohol, but after this time they tend to harden. It is therefore advisable to collect them directly into, or to transfer them into, another preservative, such as Oudeman's fluid; this consists of glycerine (five parts), 70 % alcohol (87 parts) and glacial acetic acid (eight parts). Soft-bodied or weakly sclerotized mites can be placed directly on a micro-scope slide in a drop of mountant such as Hoyer's medium (made from 50 ml dis-tilled water, 30 g crystalline gum arable, 200 g chloral hydrate and 20 ml glycerine). Sclerotized mites are first cleared by placing them for a few hours to several days, depending on the degree of sclerotization, in lactophenol (50 parts lactic acid, 25 parts phenol crystals, 25 parts distilled water). After washing in several changes of water to remove all traces of lactophenol, the specimens are orientated in a drop of mounting medium on a slide and covered with a coverglass. Mounted specimens are then baked in a 50°C incubator for several days and the coverglass afterwards ringed with clear nail varnish before microscopical examination and study. Only one specimen should be mounted on each slide (13, 14).

MEDICAL AND ECONOMIC IMPORTANCE

House dusts have heteroxen forms which have approximately 0.01 to 150 micrometer diameter and contain live-dead matters. This dusts contain certain allergens. Mite allergens are considered one of the important allergens in house dust. Because of the medical implications, house dust and the fauna of mites associated with house dust have been tested for the source of the house dust allergen. Allergy is word which we usually use for a particular group of unpleasant or dangerous symptoms which a few people get from substances which harmless to most of us. We don't start out with allergies, but become allergic as a result of contact with the things which cause it. Mites and insects that inhabit buildings as well as bacteria, fungi, and algae appear to have allergenic properties (12-15). The influence of house dust mites to the overall problem of dust allergies is not clearly known (16, 17). Mite allergens are mainly present in faeces of house dust mites and may become airborne and inhaled by patients, giving rise to asthma, rhinitis or atopic dermatitis (18-24).

CONTROLS

Reduce the humidity below 70 per cent. Thoroughly vacuum mattresses, carpets, sofas, and chairs. Very sensitive individuals should encase their mattresses in plastic. Use drapes that can be washed and change bed clothing frequently. Vacuuming does not always remove all the live mites and Korsgaard (25) stresses reducing humidity over sanitation.

In order to kill mites by acarisid makes virtually no sense. Because, this could also lead to killing of natural enemies of mites to invade environment . In addition, killing of mites would not the resolution since faeces of them contains some allergic glicoproteins with a 24.000 Dalton MW. Inhalation of these substances needs to be prevented. To remove of the mites by vacuum cleaner with water system inside the houses is presently seen the most effective way (26-32). No one method has been found for reducing mites and relieving allergy suffering. Immunotherapy, i.e., injections of mite extracts into the patients to increase antibody level, has had variable success (33-35).

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