Carpet Beetle *Anthrenus Verbasci*, Linnaeus 1767: A New Seasonal Indoor Allergen: Case Report

Yeni Bir Mevsimsel Ev İçi Allerjen: Halı Böceği *Anthrenus Verbasci*, Linnaeus 1767

Mahir İĞDE, MD[a]
Mustafa AÇICI, MD[b]
Füsun ARTIRAN İĞDE, MD[c]
Şinasi UMUR, MD[b]

Departments of
[a]Pediatric Allergy,
[c]Family Medicine,
Ondokuz Mayıs University
Faculty of Medicine,
[b]Department of Parasitology,
Ondokuz Mayıs University
Faculty of Veterinary Medicine,
Samsun

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Yazışma Adresi/*Correspondence:*
Füsun ARTIRAN İĞDE, MD
Ondokuz Mayıs University
Faculty of Medicine,
Department of Family Medicine,
Samsun,
TÜRKİYE/TURKEY
fartiran@yahoo.com

ABSTRACT A 5-year-old boy presented with a 4-year history of recurrent rhinitis during winter seasons. Although the serum total IgE level was high, no atopy was detected to common regional allergens by skin prick tests. Patient's house was infested with larva and adult forms of a carpet beetle. The insect was identified as *Anthrenus verbasci*. Skin test with *A. verbasci* was planned but the parents did not consent for intradermal injection. Eradication of the beetle from the patient's house was followed by complete clinical improvement. Patients presenting to the pediatric allergy department were injected with the extract of the beetle and one patient tested positive out of 19; this most likely supports our opinion of defining *A. verbasci* as a new allergen. In conclusion, seasonal infestation of houses with *A.verbasci* might have given rise to a new source of indoor allergens in the Black Sea Region of Turkey and in similar geographical areas as well.

Key Words: Rhinitis; weevils; insects; coleoptera

ÖZET Beş yaşındaki erkek çocuğun dört yıldır kış mevsiminde tekrarlayan rinit şikâyetleri mevcuttu. Serum total IgE düzeyi yüksek olup, deri testinde sık görülen bölgesel allerjenlere karşı herhangi bir atopi saptanmadı. Hastanın evinin bir tür halı böceğinin erişkin ve larva formu ile sarılı olduğu tespit edildi ve söz konusu böceğin *Anthrenus verbasci* olduğu anlaşıldı. *A. verbasci*'nin intradermal enjeksiyonla deri testi planlandı fakat aile izin vermediği için bu işlem gerçekleştirilemedi. Yaşam alanının böceğin larva ve erişkin formundan temizlenmesi ile tam bir klinik iyileşme elde edildi. Söz konusu antijenik ekstre polikliniğe başvuran hastalara uygulandığında, 19 olgunun birinde pozitif olarak tespit edilmiş olması, *A. verbasci*'nin yeni bir ev içi allerjen olduğu yönündeki görüşümüzü desteklemektedir. Sonuçta, *A. verbasci* tekrarlayıcı tipte mevsimsel olarak görülen allerjik yakınmalara sebep olması nedeniyle, Karadeniz Bölgesi ve benzer coğrafi koşullara sahip bölgeler için ev içi allerjenler açısından yeni bir etken olarak düşünülebilir.

Anahtar Kelimeler: Rinit; buğday biti; böcekler; kın kanatlılar

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Sensitization of children to indoor allergens has been demonstrated to be one of the major risk factors for development of allergic diseases, especially for asthma and allergic rhinitis. Allergic rhinitis is divided into seasonal allergic rhinitis (hay fever) which is triggered by pollens and moulds and perennial allergic rhinitis in which house dust mites and pet dander are the predominant triggers.[1] However, some indoor allergens may be found only during a particular season. Asian ladybugs (*Harmonia axyridis*) are a good example for such kind of seasonal indoor allergens. It is epidemiologically and clinically important to understand variations of within-home seasonal allergens.

We reported a new seasonal allergen, *Anthrenus verbasci* from the Black Sea Region of Turkey. In our case after cleaning *Anthrenus verbasci* from the household environment, clinical manifestations improved dramatically. The aim of the study was to draw attention to seasonal exposure to carpet beetle larvae and adult forms, which cause allergic rhinitis.

CASE REPORT

A 5-year-old boy who presented to the Family Medicine Department was referred to the Pediatric Allergy Department. He has suffered from rhinitis since he was one year old and has had exacerbations during cold days, especially in the winter season.

After the parents of the patient provided informed consent, skin prick tests with a battery of common allergens was performed. Allergens were house dust mites (*Dermatophagoides pteronyssimus, Dermatophagoides farinea*), cochroach, grass pollen mix, (*Poa pratensis, Alopecurus pratensis* and *Artemisia vulgaris, Chenapodium album*), *Fagus silvatica, Fraxinus excelsor*, cat, *Alternaria alternata, Aspergillus fumigatus, Cladosporium herbarum*, feather, latex, cow's milk, hen's egg, soya, wheat, and peanut. A mean wheal diameter of at least 3 mm greater than that of the negative control was considered positive.

Although serum total IgE level was high, skin prick test results were negative. Allergy department arranged standard allergic rhinitis treatment and instructed parents to get some house dust from the patient's living area. Parents brought house dust to the Parasitology Laboratory of Veterinary Medicine and 30 dermested beetles (20 larvae and 10 adults) were found in dust taken from the nursery and the bedroom. The dermested beetles were identified as *A.verbasci*, Linnaeus 1767 using the characteristics described by Bousquet (Figure 1).[2] Naphthalene is recommended as a fumigant for the pest. After naphthalene usage, the larvae of dermested beetle and the adult forms disappeared from the house. Pediatric allergy department planned skin test with *A.verbasci* extract but the parents did not consent for the test. However, after cleaning the dermested beetles from the environment, the child recovered clinically and no more medication was needed after a while. Although we could not test the *A. verbasci* extract in this patient, patients who presented to the pediatric allergy department were tested intradermally and one case tested positive out of 19. We plan to determine the regional sensitivity in a large study group using skin tests with the antigenic extract of *A. verbasci*.

FIGURE 1: *Anthrenus verbasci* (Adult and larva).

DISCUSSION

The Black Sea Region of Turkey is highly humid throughout the year; therefore, house dust mites and moulds become important indoor allergens.[3]

Unfortunately, detailed data on different indoor allergens and their seasonal variations in this region are lacking.

In our case, the patient's house was infested with adult and larvae forms of *A.verbasci*. Eradication of the beetle from the patient's environment was followed by complete clinical improvement of the patient.

Rhinitis, rhinoconjunctivitis, sneezing, cough, dyspnea, wheezing, dermatitis and asthma episodes after Dermestidae exposure in wool workers and museum personnel has been described in the literature.[4-6] *A. verbasci* occasionally is found in flour mills and warehouses; however, it is primarily a household pest with the larvae form feeding on wool, fur, skins and other materials of human or animal origin.[7,8]

Only a few cases have been reported for *A.verbasci* as a potential allergen. Ahmed et al[9] suggested

that a 22-year-old man presenting with a 5-year history of recurrent urticarial and papulovesicular lesions had immediate-type hypersensitivity to some of the antigens extracted from the larvae of *A. verbasci*. Baldo et al[10] reported specific IgE antibodies against some antigenic structures of *A.verbasci* in sera obtained from subjects with inhalant allergies to insects. Some studies reported that contamination of the silk wastes by an insect from the genus Anthrenus was important in the etiology of night asthma.[10-12]

To control carpet beetles, dust formulations can be used including desiccants for attics and wall voids and other inaccessible places. Fumigation may be necessary when infestation is extensive, although success can be limited by the ability of the fumigant to penetrate all the areas in which carpet beetles hide. Fumigants, such as naphthalene, can be used in small, tightly closed containers. Insecticide-impregnated resin strips labeled to control carpet beetles on fabrics are usually more effective in protecting susceptible objects inside enclosed containers.[13] Woolen carpets, clothing and blankets may be sprayed lightly with a ready-to-use aerosol spray such as resmethrin before placing in storage.

Adult forms of *A.verbasci* commonly feed outdoors on pollen and enter the home to lay eggs during spring and summer.[9] It stays as larvae in the colder season and during spring, and as temperatures rise, the pupal stage develops. The adult beetles themselves usually feed outdoors with flower pollens.[14,15]

The beetles are intolerant to cold and it is unexpected to find the adult forms in houses especially during the winter season. It was believed that the adult beetle population would be controlled by the cold winters. However, rather than freezing, the adult forms of *A.verbasci* may swarm and invade houses in the early fall, so it may cause seasonal indoor allergy by increasing allergen concentration of adult forms especially during the winter season as in our case.[16]

In conclusion, this case is the first paper from Turkey, which reports on allergic rhinitis most likely caused by the seasonal indoor allergen *A. verbasci*. Seasonal infestation of houses with *A. verbasci* might have given rise to a new source of indoor allergens in the Black Sea Region and it may be necessary to take some preventive measures against *A. verbasci* to decrease morbidity of allergic rhinitis and asthma in this region and similar geographical areas.

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