House dust mites associated with the asthmatic patients
in some houses of Cairo, A.R. Egypt

Mohamed A. Kenawy¹, Ashraf A. Awad¹, Akila M. El-Shafei¹, Nadia Helmi¹, Yousry M. Abdel-Hamid³ and Yousry Z. A. El-Zohery²
1- Department of Entomology, Faculty of Science, Ain Shams University; 2- Research Institute of Medical Entomology, The General Organization for Institutes and Teaching Hospitals, Ministry of Health, Dokki, Giza; 3- Department of Haematology and Immunology, Faculty of Medicine, Al-Azhar University, Cairo, A.R. Egypt.

ABSTRACT

The study examines the species composition of the house dust mites in houses of patients suffering from bronchial asthma in Cairo. Six mite species belonging to 4 families were identified of which *Dermatophagoides farinae* and *D. pteronyssinus* (*Pyroglyphidae*) were the common species, *Blomia tropicalis* (*Glycyphagidae*) was first detected in Cairo houses and *Cheyletus trouessarti* (*Cheyletidae*) may represent a new report in houses of allergic patients in Egypt. The two other species were: *Tyrophagus putrescentiae* (*Acariidae*) and *Acarus siro* (*Acaridae*). Based on this study and of the other workers, a list of 16 species belonging to 7 families associated with house dust in Egypt was presented.

Keywords: House dust mites, Species composition, *Dermatophagoides pteronyssinus*, *Dermatophagoides farinae*, Bronchial asthma.

INTRODUCTION

The house dust mites (HDM’s) are microscopic arthropods of class *Arachnidae* (subclass: *Acarri*, order: *Acariformis*) present in most of the indoor environments living associated with man in mattresses, pillows, overstuffed furniture and other places where human rests (Yassin, 2011). They feed on organic matter in the house dust (HD) which consists mainly of human shed skin scales, fungi and food or waste particles. HDM’s are of great medical importance as responsible for causing asthma, rhinitis and atopic dermatitis (Gamal-Eddin et al., 1982; Milian and Diaz, 2004; Nadchatram, 2005; El-Shazly et al., 2006 and O’Neil et al., 2006).

Different HDM forms are present of which *Dermatophagoides farinae* Hughes "the American HDM" and *D. pteronyssinus* (Trouessart) "the European HDM" of family *Pyroglyphidae* are the most common and important as causative of asthmatic bronchitis (Adham et al., 2011; Adham and Tawfik, 2012 and Yassin, 2011).

Under the Egyptian environmental conditions, mite induced allergy especially bronchial asthma forms a problem (Frankland and El Hefny, 1971). It was suggested (Gamal-Eddin et al., 1982) that the geographical situation of Egypt and its favorable climatic conditions together with other factors may play a major role in the abundance of HDM’s and consequently HDM allergy occurs more common than to any other allergen in the Egyptian asthmatic patients (Gamal-Eddin et al., 1985).

This work was planned for and objected at further examining and updating the species composition of HDM’s in houses of patients suffering from bronchial asthma in Cairo.

MATERIALS AND METHODS

Dust samples were collected using a portable vacuum cleaner off carpets, sofas and furniture in houses of five asthmatic patients in Cairo. After collection, samples were brought to the laboratory where live mites were isolated from the dust samples using a modified Berlese funnel with copper wire sieve. The method was essentially the same as that of Sinha (1964) and adopted by Gamal-Eddin and Hamad (1992) and Morsy.
Mohamed A. Kenawy et al. (1994). A total of 100 mites were picked up randomly from each dust sample and microscopically identified according to the keys given by Bronswijk and Sinha (1971).

**RESULTS**

Mites were isolated from dust samples collected in houses of five asthmatic patients in Cairo. The reported species and their relative abundance are in Table (1). Six mite species belonging to four families were found of which, *Dermatophagoides farinae* Hughes (Pyroglyphidae) was the predominant species detected in 4 (80%) houses. *Dermatophagoides pteronyssinus* (Trouessart) (Pyroglyphidae) and *Tyrophagus putrescentiae* (Schrank) (Acaridae) were found in 3 (60%) houses each, however the former species was in larger number than the second one. *Acarus siro* Linnaeus (Acaridae) was observed in 2 (40%) houses. Both *Blomia tropicalis* (Bronswijk, Cock and Oshima) (Glycyphagidae) and *Cheyletus trouessarti* Oudemans (Cheyletidae) were detected in 1 (20%) house.

Table 1: House dust mite species and their abundance in houses of five asthmatic patients in Cairo.

<table>
<thead>
<tr>
<th>House</th>
<th>Case</th>
<th>Mite species</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>District</td>
<td>Age (Yr.)</td>
</tr>
<tr>
<td>1</td>
<td>Nasr City</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>Heliopolis</td>
<td>07</td>
</tr>
<tr>
<td>3</td>
<td>Shoubra</td>
<td>06</td>
</tr>
<tr>
<td>4</td>
<td>Abbassia</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>Hadai El-Kobba</td>
<td>04</td>
</tr>
</tbody>
</table>

| % positive houses | 60 | 80 | 60 | 40 | 20 | 20 |

From the results of the present and previous studies, irrespective to the variable distribution (geographically and locally), the mite fauna associated with house dust in Egypt comprises 16 species belonging to 7 families (Table 2).

Table 2: Reported fauna of house dust mites (*Arachnida: Acariformes*) in Egypt

<table>
<thead>
<tr>
<th>Family</th>
<th>Genus, species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyroglyphidae</td>
<td><em>Dermatophagoides farinae</em> Hughes</td>
</tr>
<tr>
<td></td>
<td><em>Dermatophagoides pteronyssinus</em> (Trouessart)</td>
</tr>
<tr>
<td>Raphignathidae</td>
<td><em>Raphignathus (= Acheles) gracilis</em> (Rack)</td>
</tr>
<tr>
<td>Glycyphagidae</td>
<td><em>Glycyphagus domesticus</em> (De Geer)</td>
</tr>
<tr>
<td></td>
<td><em>Glycyphagus aegyptiacus</em></td>
</tr>
<tr>
<td></td>
<td><em>Blomia kulagini</em> Zachvatkin</td>
</tr>
<tr>
<td></td>
<td><em>Blomia tropicalis</em> (Bronswijk, Cock and Oshima)</td>
</tr>
<tr>
<td></td>
<td><em>Leptidoglyphus destructor</em> (Schrank)</td>
</tr>
<tr>
<td>Acaridae</td>
<td><em>Acarus siro</em> Linnaeus</td>
</tr>
<tr>
<td></td>
<td><em>Tyrophagus putrescentiae</em> (Schrank)</td>
</tr>
<tr>
<td></td>
<td><em>Rhizoglyphus robini</em> Claparede</td>
</tr>
<tr>
<td>Cheyletidae</td>
<td><em>Cheyletus hendersoni</em> Baker</td>
</tr>
<tr>
<td></td>
<td><em>Cheyletus malaccensis</em> Oudemans</td>
</tr>
<tr>
<td>Macronyssidae</td>
<td><em>Ornithonyssus bacoti</em> (Hirst)</td>
</tr>
<tr>
<td>Laclapidae</td>
<td><em>Haemogamasus pontiger</em> (Berlese)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The HDMs are of great medical importance due to their incrimination in causing allergic manifestations in human being (Morsy et al., 1994). The common syndromes associated with HDM allergy...
as considered by Gamal-Eddin et al. (1982) are the bronchial asthma and perennial rhinitis. They are generally found in most houses (Yassin and Rifaat, 1997) and mainly in bed rooms. According to Manusell et al. (1971) the degree of mite infestation tends to be related to severity of allergic symptoms of patients.

In the present work, six mite species belonging to 4 families were isolated from the house dust collected in houses of 5 asthmatic patients in Cairo. The collected mites in a descending order of abundance (% +ve houses) were Dermatophagoides farinae (80%), D. pteronyssinus (60%), Tyrophagus putrescentiae (60%), Acarus siro (40%), Blomia tropicalis (20%) and Cheyletus trouessarti (20%).

The identified species except Cheyletus trouessarti have been reported (along with other species) by several workers from some Governorates in Egypt: Gharbiya (Gamal-Eddin et al., 1982 & 1985), El-Menia (Gamal-Eddin and Shoker, 1989a), Sharquiya (Gamal-Eddin and El-Besheir, 1990), Cairo (Morsy et al., 1995 and Yassin, 2011), Kena, Esna City (Yassin and Rifaat, 1997), Alexandria (Sadaka et al., 2000), Dakahlia (El-Shazly et al., 2006) and North Sinai, Al-Arish city (El-Sherbiny et al., 2010).

Although the present collection was very limited (included only five houses of asthmatic patients), the 1st four of the reported species were also recovered indoors by Koraiem and Fahmy (1999) in a survey of eight different areas in Greater Cairo. The reported Blomia tropicalis was also collected in El-Menia Governorate (Gamal-Eddin and Shoker, 1989a) although it was not detected by Koraiem and Fahmy (1999) in Cairo houses. The finding of Cheyletus trouessarti may represent a new report in houses of allergic patients in Egypt or may be the Cheyletus sp. collected in Gharbiya (Gamal-Eddin et al., 1982) and El-Menia (Gamal-Eddin and Shoker, 1989a & b).

The two pyroglyphid mites, D. farinae and D. pteronyssinus were common in agreement with the observations of several authors. The role of these two mites as causative of inhalant allergic problem is well established (Gamal-Eddin et al., 1982) and they are known to produce the most potent allergens (Gamal-Eddin and Hamad, 1992 and Morsy et al., 1995). The living mites, their dead bodies and their excretory products (glandular secretions and faecal droplets) are considered as sources of active HD allergens by several authors (Mitchell et al., 1969; Spieksma and Spieksma-Boezemans, 1969; Wharton, 1976; Gamal-Eddin et al., 1982 and Morsy et al., 1994). The inhalation of such materials can cause the clinical syndromes of the disease.

From the present study and previous ones, it can be concluded that sixteen species of HDM’s are present in Egypt of which the two pyroglyphid mites, D. farinae and D. pteronyssinus are the most common species associated with asthmatic cases

REFERENCES


El-Shazly, A.M.; El-Beshbishi, S.N.; Azab, M.S.; El-Nahas, H.A.; Soliman, M.E.; Fouad, M.A. and

House dust mites associated with the asthmatic patients in some houses of Cairo, A.R. Egypt


chitinase allergens Der p 15 and Der p 18 from *Dermatophagoides pteronyssinus*. Clin. Exp. Allergy, 36:831-839


**RABIC SUMMARY**

حمض الغبار المنزلى المرتبط بمرضى حساسية الصدر في بعض منازل القاهرة، جمهورية مصر العربية

محمد أمين قناعى 1، أشرف عبد الله عوض 1، عقيله محمد الشافعي 1، ناديه حلمى أحمد 1

1- قسم علم الحشرات، كلية العلوم، جامعة عين شمس

2- ميدى بحوث الحشرات الطبية، وزارة الصحة، الدقي، جيزة

3- قسم المناهج وعلوم الدم، كلية الطب، جامعة الأزهر، القاهرة، جمهورية مصر العربية

تنناول الدراسة التركيب النوعي للغبار في غبار المنازل لمرضى يعانون من ازمات روبية بسبب حلم غبار المنازل. تم تشخيص 6 أنواع من الحلم تتبث أربع عائلات مختلفة وهي: درماتوفاجيودس فاريتي (أتراوس) ودرماتوفاجيودس بيترسنس (بروجيلヴィディ) وتيروفاجيودس يوبيسيني (أكاريدي)، حمل ميتس بورتوسيني (أكاريدي) وتيروفاجيودس كيليتسو تىتارس (كلينكليدي). تبين النتائج أن كل من حلم الغبار الأوروبي دي بيتروسيني وحلم الغبار الأمريكي دي فاريتي هو الأكثر شيوعاً وتواجد سي روسيكيديس لأول مرة في القاهرة. كما وافق دراسات أخرى مشابهة هذا النوع في منازل مرضى حساسية الغبار في مصر. من نتائج هذه الدراسة والدراسات السابقة، تضمن البحث قائمه تشمل 16 نوعاً من الحلم تتبث 7 عائلات

والتي تتواجد في غبار المنازل في مصر.