

## SHORT PERSPECTIVE

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# Sensitization and Geographical Distribution of Main Aeroallergens in Iran

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## INTRODUCTION

Aeroallergens are one of the most important environmental factors that induce allergic reactions in sensitized population. Pollen grains, molds, house dust mites, and animal dander are of major concern because of their abundant sources and ubiquitous presence in environments. Identifying the allergens in geographical areas plays an important role in the diagnosis; prevention and management of allergic disorders. Here, we discussed the most common aeroallergens in Iran and suggested appropriate preventive strategies to decrease the morbidity of allergic patients. The sensitivity to the most common aeroallergens affecting Iranian population is summarized in Table 1. Further delineation of these factors is provided below.

### Pollen Grains

Pollen grains are the main aeroallergens responsible for allergic diseases in Iran. The main source of pollen allergens in Iran is anemophilous weeds and the perennial to shrubby taxa of the Amaranthaceae and Asteraceae families. The pollen of *Kali tragus*, with a range of 52.4-72.5% positive reactivity in allergen

tests, is the most important aeroallergen responsible for allergic rhinitis in the cities of Tehran,<sup>28</sup> Mashhad,<sup>13</sup> and Ahvaz.<sup>1</sup>

### Arthropods and House Dust Mites

The northern and southern areas of Iran are suitable places for this allergenic source.<sup>17</sup>

In northern Iran, the most commonly reported aeroallergen mites are the pyroglyphids, such as *Dermatophagoides pteronyssinus*, *D. farinae* and *Euroglyphus maynei*. *Dermatophagoides farinae* has been the most abundant mite species in the whole country.<sup>34</sup>

### Cockroaches

Cockroaches are more common in the humid and warm areas of North and South Iran.<sup>35</sup> Although the reports of allergic asthma caused by cockroach aeroallergens are usually in children, in a study in Southwest Iran, there were more positive adult skin prick tests than child skin prick tests,<sup>36</sup> possibly due to more frequent exposure to cockroach allergens in adults.

**Keywords:** Aeroallergens; Allergic reaction; Animal dander; Asthma; Iran

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**Table 1. Sensitivity to the most common aeroallergens in different regions of Iran**

Region	Prevalent aeroallergens	Complication	Diagnostic Method	Reference
Ahvaz	Pollen grains, mites, cockroaches and <i>Alternaria</i>	Allergic symptoms	Skin Prick Test	Shakurnia 2013, <sup>1,2</sup>
	Fungi ( <i>Cephalosporium</i> , <i>Penicillium</i> , <i>Alternaria</i> and <i>Aspergillus</i> species)	Allergic symptoms	Skin Prick Test	Shakurnia 2013, <sup>3</sup>
	Mites and cockroaches	Asthma and allergic rhinitis	Skin Prick Test	Shakurnia 2013, <sup>1</sup>
	Fungi ( <i>Aspergillus</i> , <i>Candida</i> , <i>Rhizopus</i> , <i>Penicillium</i> and <i>Alternaria</i> species)	Infection of burn wounds	Conventional mycological methods	Rafiei 2006, <sup>4</sup>
Bushehr	Mites, mold and animal dander	Asthma and allergic rhinitis	Skin Prick Test	Farokhti 2015, <sup>5</sup>
Esfahan	Mites and pollen grains	Eczema and urticaria	Skin Prick Test	Farokhti 2014, <sup>6</sup>
	Pollen grains and molds	Asthma, allergic rhinitis, eczema and urticaria	Skin Prick Test	Akbari 2000, <sup>6</sup>
Karaj	Pollen grains, cockroaches and mites	Allergic rhinitis and asthma	Skin Prick Test	Farhoudi 2005, <sup>7</sup>
	Cockroaches	Asthma	Skin Prick Test	Farhoudi 2003, <sup>8</sup>
Kerman	Pollen grains and cockroaches	Atopic dermatitis, Allergic rhinitis and urticaria	Skin Prick Test	Fouladseresht 2014, <sup>9</sup>
Mashhad	<i>A. alternata</i>	Allergic rhinitis	Skin Prick Test	Mokhtari 2011, <sup>10</sup>
	Pollen grains and mites	Asthma	Skin Prick Test	Behmanesh 2010, <sup>11</sup>
	Pollen grains	Allergic rhinitis	Skin Prick Test	Fereidouni 2009, <sup>12</sup>
Qazvin	Pollen grains, cockroaches and <i>A. alternata</i>	Allergic rhinitis	Skin Prick Test	Mahram 2013, <sup>13</sup>
Sari	Mites	Chronic urticaria	Skin Prick Test	Ghaffari 2011, <sup>14</sup>
	Mites, cockroaches and feathers	Allergic rhinitis and asthma	Skin Prick Test	Ghaffari 2010, <sup>15</sup>
	Fungi ( <i>Cladosporium</i> , <i>Aspergillus</i> , <i>Penicillium</i> and <i>Alternaria</i> species)	Asthma	Histopathological and Conventional mycological methods	Hedayati 2010, <sup>16</sup>
	<i>A. alternata</i>	Atopic dermatitis and asthma	Immunoblotting Technique	Hedayati 2009, <sup>17</sup>
	Fungi ( <i>Cladosporium</i> , <i>Aspergillus</i> and <i>Penicillium</i> species)	Asthma	Standard Mycological Techniques.	Hedayati 2005, <sup>18</sup>
Semnan	Fungi ( <i>Alternaria</i> and <i>Cladosporium</i> species)	Asthma	Skin Prick Test	Nabavi 2010, <sup>19</sup>
	Fungi ( <i>Aspergillus</i> , <i>Cladosporium</i> , <i>Alternaria</i> and <i>Penicillium</i> species)	Allergic rhinitis	Skin Prick Test	Nabavi 2009, <sup>20</sup>
Shiraz	Fungi ( <i>Alternaria</i> , <i>Aspergillus</i> , <i>Rhizopus</i> , and <i>Penicillium</i> species)	Asthma	Skin Prick Test	Moghtaderi 2010, <sup>21</sup>
Shiraz	Pollen grains and mites	Allergic rhinitis	Skin Prick Test	Kashef 2003, <sup>22</sup>

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Sistan-Baluchestan	<i>Aspergillus</i> and <i>Cladosporium</i> species, mites, pollen grains, cockroaches and feathers	Allergic rhinitis	Skin Prick Test	Khazaei 2015, <sup>23</sup>
Sistan-Baluchestan	Mites, feathers, and <i>Aspergillus</i> , <i>Alternaria</i> and <i>Cladosporium</i> species	Allergic disease	Skin Prick Test	Khazaei 2003, <sup>24</sup>
Tehran	Pollen grains, mites, animal dander and molds	Allergic rhinitis	Skin Prick Test	Pazoki 2015, <sup>25</sup>
Tehran	Pollen grains and cockroaches	Asthma	ImmunoCAP system	Teifoori 2014, <sup>26</sup>
Tehran	Pollen grains and <i>A. alternata</i>	Allergic symptoms	Skin Prick Test	Hosseini 2014, <sup>27</sup>
Tehran	Pollen grains	Allergic rhinitis	Skin Prick Test	Arshi 2010, <sup>28</sup>
Tehran	Pollens and mites	Allergic rhinitis	Skin Prick Test	Mohammdi 2008, <sup>29</sup>
Tehran/Karaj	Pollen grains	Allergic symptoms	Skin Prick Test	Movahedi 2000, <sup>30</sup>
Yazd	Insect aeroallergens, cockroaches and mites	Allergic rhinitis	Skin Prick Test	Bemanian 2012, <sup>31</sup>
Zahedan	Mites, feathers, and <i>Aspergillus</i> , <i>Cladosporium</i> and <i>Alternaria</i> species	Allergic disease	Skin Prick Test	Khazaei 2002, <sup>32</sup>
Zanjan	Pollen grains, mites, and cockroaches	Asthma, atopic dermatitis and urticaria	Skin Prick Test	Ahmadiafshar 2008, <sup>33</sup>

### Animal Dander

Exposure to animal dander rapidly induces respiratory symptoms in individuals who are sensitive to cat or dog dander or any kind of bird feather. Farrokhi et al.<sup>5</sup> and Khazaei,<sup>26</sup> found that the prevalence of feather allergies was 78.5%, and 70% in Bushehr, Sistan and Baluchistan, respectively. The lower prevalence of allergies to feathers than to cat dander may be due to genetic factors or to a lower exposure to birds than to cats in the Iranian populations.

### Molds

Fungal spores are a significant component of bioaerosols because of their abundant sources and ubiquitous presence in environments. *Penicillium spp.*, *Aspergillus spp.*, *Cladosporidium spp.*, *Alternaria spp.*, and *Zygomycota (Mucor & Rhizopus spp.)* are the most abundant indoor/outdoor fungal spores in various regions of Iran.<sup>37</sup>

### Conclusion

Weed species, especially *Kali tragus*, *Chenopodium album*, *Amaranthus retroflexus* and *Amaranthus palmeri*, cause the majority of pollen-induced allergies in most parts of Iran.<sup>38</sup> It is clear that while the most prevalent species of mites all over the country are *Dermatophagoides farinae* (*D. farinae*) and

*Dermatophagoides pteronyssinus* (*D. pteronyssinus*), the sensitivity to these mites differs in separate reports from various parts of Iran. There is no relation between climatic conditions and the prevalence of sensitivity to cockroaches. This may be due to different biology and health conditions as well as the dependency of cockroaches on habitat rather than climate conditions.

The most important common aeroallergen in some Iranian homes in several regions is animal feathers,<sup>6</sup> which could be the result of increasing tendency of people to keep pets and domestic animals in these regions. This kind of allergen is distributed widely and constantly exists even in homes without pets.

Therefore, the control of frequent allergens in all areas and the avoidance of allergen propagules could play important roles in reducing allergic reactions in susceptible individuals.

### REFERENCES

1. Shakurnia A, Assarehzadegan MA, Mozaffari A, Shakerinejad G, Maneshdavi N, Amini A, et al. Prevalence of aeroallergens in allergic patients in Ahvaz. *J Mazandaran Univ Med Sci* 2013; 12(21):81–90.
2. Shakurnia A, Assarehzadegan MA, Mozaffari AR, Amini A. Prevalence of aeroallergens sensitivity in asthmatic patients from Ahvaz. *Jentashapir Journal of Health Research* 2014; 5(1):461-8.

3. Shakurnia AH, Assarehzadegan MA, Amini A, Shakerinejad G. Prevalence of Fungal Allergens in Respiratory Allergic Patients in Ahvaz City, Southwest Iran. *Jundishapur J. Microbiol* 2013; 6(4):48-64.
4. Rafiei A, Hemadi A, Hamzehlouei F. Determination of fungal colonization among burn patients referred to Taleghani Hospital, Ahvaz. *J Clinic Infect Dis* 2006; 11(34):41-4.
5. Farrokhi S, Gheybi MK, Movahed A, Tahmasebi R, Iranpour D, Fatemi A, et al. Common Aeroallergens in Patients with Asthma and Allergic Rhinitis Living in Southwestern Part of Iran: Based on Skin Prick Test Reactivity. *Iran J Allergy, Asthma Immunol* 2014; 14(2):133-8.
6. Akbary H, Rezaei A. Skin test assay in allergic patients of Esfahan city. *Research Med Sci* 2000; 5(7):68-77.
7. Farhoudi A, Razavi A, Chavoshzadeh Z, Heidarzadeh M, Bemanian M, Nabavi M. Descriptive study of 226 patients with allergic rhinitis and asthma. *Iran J Allergy, Asthma Immunol* 2005; 4(2):99-102.
8. Farhoudi A, Pourpak Z, Mesdaghi M, Chavoshzadeh AKZ. The study of cockroach allergy in Iranian children with asthma. *Acta Med Iran* 2003; 41(3):150-5.
9. Fouladseresht H, Safiri S, Moqaddasi M, Razeghi MS, Bazargan N. Prevalence of food and airborne allergens in allergic patients in Kerman. *Journal of Kermanshah University of Medical Sciences. J Kermanshah Univ Med Sci* 2014; 18(4):234-41.
10. Mokhtari Amirmajidi M, Mokhtari Amirmajidi NA, Eftekharzadeh Mashhadi I, Jabari Azad F, Tavakol Afshari J, Shakeri MT. *Alternaria* in patients with allergic rhinitis. *Iran J Allergy Asthma Immunol* 2011; 10(3):221-6.
11. Behmanesh F, Shoja M, Khajedaluae M. Prevalence of aeroallergens in childhood asthma in Mashhad. *Maced J Med Sci* 2010; 3(3):295-8.
12. Fereidouni M, Hossini RF, Azad FJ, Assarehzadegan MA, Varasteh A. Skin prick test reactivity to common aeroallergens among allergic rhinitis patients in Iran. *Allergol Immunopathol* 2009; 37(2):73-9.
13. Mahram M, Barikani A, Nejatian N. The Frequency of Common Allergens in Allergic Rhinitis among the Patients Referred to the Allergy Clinic of Qods Hospital in Qazvin during 2007-2010. *J Aller Ther* 2013; 4(130):2.
14. Ghaffari J, Rafatpanah H, Khalilian A, Nazari Z, Ghaffari R. Skin Prick Test In Asthmatic, Allergic Rhinitis And Urticaria Patients. *Med J Mashhad Uni Med Sci* 2011; 54(1): 44-9.
15. Ghaffari J, Khademloo M, Saffar MJ, Rafiei A, Masiha F. Hypersensitivity to house dust mite and cockroach is the most common allergy in north of Iran. *Iran J Immunol* 2010; 7(4):234-9.
16. Hedayati MT, Bahoosh M, Kasiri A, Ghasemi M, Motahhari SJ, Poormosa R. Prevalence of fungal rhinosinusitis among patients with chronic rhinosinusitis from Iran. *Med Mycol J* 2010; 20(4):298-303.
17. Hedayati MT, Arabzadehmoghadam A, Hajheydari Z. Specific IgE against *Alternaria alternata* in atopic dermatitis and asthma patients. *Eur Rev Med Pharmacol Sci* 2009; 13(3):187-91.
18. Hedayati MT, Mayahi S, Aghili R, Goharimoghadam K. Airborne fungi in indoor and outdoor of asthmatic patients' home, living in the city of sari. *Iran J Allergy Asthma Immunol* 2005; 4(4):189-91.
19. Nabavi M, Ghorbani R, Farzam V. Prevalence of mold allergy in asthmatic patients of less than 18 years old in Semnan. *Journal of Kerman University of Medical Sciences. J Kerman Univ Med Sci* 2010; 17(4):328-36.
20. Nabavi M, Ghorbani R, Bemanian M, Rezaie M. Prevalence of mold allergy in patients with allergic rhinitis referred to Semnan clinic of allergy. *J Semnan Univ Med Sci* 2009; 11(1):27-32.
21. Moghtaderi M, Aleyasin S, Amin R, Kashef S. Skin test reactivity to fungal aeroallergens in asthmatic children in southern Iran. *Iran. J Pediatr* 2010; 20(2):242-3.
22. Kashef S, Kashef MA, Eghtedari F. Prevalence of aeroallergens in allergic rhinitis in shiraz. *Iran J Allergy Asthma Immunol* 2003; 2(4):185-8.
23. Khazaei HA, Khazaei B, Dashtizadeh GA, Mohammadi M. Cigarette Smoking and Skin Prick Test in Patients With Allergic Rhinitis. *Int J High Risk Behav Addict* 2015; 4(3):23-83.
24. Khazaei HA HS, Aghamohammadi, A FF, Rezaei N. The study of type I allergy prevalence among people of South-East of Iran by skin prick test using common allergens. *Iran J Allergy, Asthma Immunol* 2003; 2(3):165-8.
25. Pazoki N, Ahmadi A, Mansori M, Mosavi Khorshidi SM, Onori F, Salimian J. Prevalence of Aeroallergens in Patients with Allergic Rhinitis. *J Mazandaran Univ Med Sci* 2015; 25(125):73-80.
26. Teifoori F, Shams-Ghahfarokhi M, Postigo I, Razzaghi-Abyaneh M, Eslamifar A, Gutiérrez A, et al. Identification of the main allergen sensitizers in an Iran asthmatic population by molecular diagnosis. *Allergy Asthma Clin Immunol* 2014; 10(1):41.
27. Hosseini S, Shoormasti RS, Akramian R, Movahedi M, Gharagozlou M, Foroughi N, et al. Skin Prick Test

## Distribution of Main Aero Allergens in Iran

- Reactivity to Common Aero and Food Allergens among Children with Allergy. *Iran J Med Sci* 2014; 39(1):29-35.
28. Arshi S, Zarrinfard R, Fereshtehnejad SM, Poorsattar Bejeh Mir A, Javahertarash N. Determination of the Prevalence of Allergy to Autumn Pollens in Allergic Rhinitis Patients Referred to the Immunology-Allergy Clinic of Hazrat Rasool-e-Akram Hospital in Tehran during 2005-06. *Razi J Med Sci* 2010; 17(75):59-67.
  29. Mohammadi K, Gharagozlou M, Movahedi M. A single center study of clinical and paraclinical aspects in Iranian patients with allergic rhinitis. *Iran J Allergy Asthma Immunol* 2008; 7(3):163-7.
  30. Movahedi M, Moin M, Farhoudi A. A comparison between diagnostic clinical tests and herbal geography in allergic patients in Tehran and Karaj cities. *Iran J Allergy, Asthma Immunol* 2000; 1(1):29-31.
  31. Bemanian MH, Alizadeh Korkinejad N, Shirkhoda S, Nabavi M, Pourpak Z. Assessment of sensitization to insect aeroallergens among patients with allergic rhinitis in Yazd City, Iran. *Iran J Allergy Asthma Immunol* 2012; 11(3):253-8.
  32. Khazaei H, Hashemi S, Aghamohammadi A, Farhoudi A, Rezaei N. Common allergens in patients with allergic disorders in Zahedan. *Zahedan J Res Med Sci* 2002; 4(3):149-54.
  33. Ahmadiafshar A, Sepehri S, Moosavinasan S, Torabi S. Recognition and frequency determination of common allergens in allergic patients of Zanjan city by skin prick test. *J Zanjan Univ Med Sci* 2008; 16(64):47-56.
  34. Fereidouni M, Fereidouni F, Hadian M, Mazandarani M, Ziaee M. Evaluation of the level of house dust mite allergens, Der p 1 and Der f 1 in Iranian homes, a nationwide study. *Allergol Immunopathol* 2013; 41(6):381-6.
  35. Teifoori F, Postigo I, and Martinez J. Learning from the Molecular Profile of *Blattella Germanica* Allergens Identified from Allergic Patients in Tehran, Iran. *Iran J Allergy Asthma Immunol* 2017; 16(2):169-70.
  36. Assarehzadegan M-A, Shakurnia A, Amini A. The most common aeroallergens in a tropical region in Southwestern Iran. *World Allergy Organ J* 2013; 6(1):7.
  37. Chadeganipour M, Shadzi S, Nilipour S, Ahmadi G. Airborne fungi in Isfahan and evaluation of allergenic responses of their extracts in animal model. *Jundishapur J Microbiol* 2010; 3(4):155-60.
  38. Baker JD. The purpose, process, and methods of writing a literature review. *AORN J* 2016; 103(3):265-9.