

Editorial

Buckwheat allergy

Buckwheat, an important crop in some regions of the world, is not taxonomically related to wheat. Common buckwheat (*Fagopyrum esculentum*) is grown in Asian countries such as China, Japan, Korea, Nepal, and Bhutan (1). There is also a traditional use of buckwheat dishes in Russia and Europe, and large-scale cultivation for the Japanese market in Canada and the USA. Tartary buckwheat (*F. tataricum*) is grown in some parts of China (2, 3). Buckwheat allergy is an IgE-mediated immediate-type reaction, sometimes causing severe reactions similar to those caused by soybean and peanut allergy (1). The allergic reaction can follow ingestion of buckwheat (4), occupational exposure (5), or domestic exposure through sleeping on a pillow stuffed with buckwheat husk (6). In 1909, Smith wrote the first scientific report on buckwheat allergy, concerning a young patient whose asthma, allergic rhinitis, urticaria, and angioedema were provoked by ingestion of small amounts of buckwheat flour (7). In this issue of *Allergy*, three cases of nocturnal asthma in Korean children are described, the cause being buckwheat chaff pillows (8). These pillows are traditionally used in Japan and Korea for health and comfort. Recently, their popularity in Europe and North America has increased, and buckwheat pillows are now regularly marketed and advertised on television.

Buckwheat allergy in Asia, Europe, and North America

There is a lack of information on the prevalence of buckwheat allergy in the population of most countries, except Japan. In the 1960s, Nakamura & Yamaguchi identified 169 cases of buckwheat allergy in a national survey of Japanese hospital patients (9). Most (86%) were young children, and both food allergy and respiratory allergy were found. The most common reaction was buckwheat asthma (82%), and in 18 cases (11%) anaphylactic shock had occurred. The largest study on buckwheat allergy was performed in 92 680 schoolchildren in Yokohama, in the 1990s (10). In total, 140 boys and 54 girls (0.22% of all children) had buckwheat allergy. The most common reactions among sensitized children were urticaria (37.3%), wheezing (26.5%), and anaphylactic shock (3.9%). The average consumption of buckwheat is low in Europe and North America, but high in some subgroups of the society. Buckwheat does not contain gluten, and is a common supplement for patients with celiac disease. We have

noticed adverse reactions among members of a society for gluten-sensitive patients. In those with celiac disease combined with other food allergies, 30% reported buckwheat intolerance, while buckwheat intolerance was rare (1%) among those with gluten intolerance only. Some subjects had specific IgE antibodies against buckwheat (RAST), and one sensitized patient had fewer stomach symptoms after avoiding buckwheat (11).

Occupational buckwheat allergy

Cases of occupational buckwheat asthma have been reported from noodle shops in Japan (12), Korea (13), Spain (4), and France (14), and a health food shop in Switzerland (15). In the USA (16), a woman suffered anaphylaxis after eating buckwheat crepes. She had been sensitized 4 years earlier when working in a factory making buckwheat husk pillows. In Sweden, 46% of 28 workers repackaging health food had symptoms (asthma, rhinitis, and skin eruptions) when handling buckwheat, and 28% were sensitized to buckwheat (5). In a study from China, only one out of 61 subjects (2%) with either occupational exposure or frequent consumption of buckwheat had a positive skin prick test to buckwheat (3).

Immunologic aspects of buckwheat allergy

Different allergens have been identified in common buckwheat, and since buckwheat allergens are thermostable, they remain after cooking (1, 2). A Japanese study showed that a 24-kDa buckwheat protein (BW24KD) was the most frequently recognized allergenic component, binding to IgE antibodies from 100% of the patients' sera (17). Recent studies have verified that BW24KD is the main allergen in common buckwheat, but other buckwheat allergens (19, 16, and 9 kDa) may be of importance (18). A 24-kDa protein has been identified and purified also in Tartary buckwheat, but it is not clear whether it is identical to BW24KD (2). Clinically relevant cross-reactivity has been demonstrated for latex (19, 20).

Concluding remarks

Buckwheat allergy can occur in different situations, even in countries with little average consumption of

buckwheat dishes and little awareness of this type of allergy. It is mostly a "pure" IgE-mediated reaction, and suspected cases can easily be verified by skin prick tests or RAST. Buckwheat is a food allergen, an occupational allergen, and the current paper in *Allergy* (8) demonstrates that it may also be a hidden domestic allergen. Earlier studies have shown that a large proportion of allergic patients are children. Hospital records indicate that buckwheat allergy is not common, but severe reactions may occur in sensitized subjects, including asthma attacks or anaphylactic shock. Reported cross-reactivity with latex allergens deserves further attention. In exposed workplaces, good occupational hygiene and use of respiratory protection

devices should be considered. Finally, for estimation of the risk of buckwheat allergy, epidemiologic studies are needed, particularly in subgroups with a high consumption of buckwheat food or use of buckwheat husk pillows.

G. Wieslander, D. Norbäck
Department of Medical Sciences/
Occupational and Environmental Medicine
Uppsala University
University Hospital
SE-751 85 Uppsala
Sweden

References

1. WIESLANDER G. Review on buckwheat allergy. *Allergy* 1996;**51**:661–665.
2. WANG Z, ZHANG Z, WIESLANDER G, NORBÄCK D, YANG B, LIN R. Purification and some properties of the protein with 24 kDa in Tartary buckwheat. *Fagopyrum* 2000;**17**:41–44.
3. WIESLANDER G, NORBÄCK D, WANG ZH, ZHANG Z, YAHONG M, LIN RF. Buckwheat allergy and reports on asthma and atopic disorders in Taiyuan City, northern China. *Asian Pac Allergy Immunol* 2000;**18**:147–152.
4. VALDIVIESO R, MONEO I, POLA J, et al. Occupational asthma and contact urticaria caused by buckwheat flour. *Ann Allergy* 1989;**63**:149–152.
5. GÖTHE CJ, WIESLANDER G, ANCKER K, FORSBECK M. Buckwheat allergy: health food, an inhalation health risk. *Allergy* 1983;**38**:155–159.
6. MATSUMURA T, TATENO K, YUGAMI S, KURIME T. Six cases of buckwheat asthma induced by buckwheat flour attached to buckwheat chaff in pillows. *J Asthma Res* 1964;**1**:219–227.
7. SMITH HL. Buckwheat poisoning with report of a case in man. *Arch Intern Med* 1909;**3**:350–359.
8. LEE SY, LEE KS, HONG CH, LEE KY. Three cases of childhood nocturnal asthma due to buckwheat allergy. *Allergy* 2001;**56**:763–766.
9. NAKAMURA S, YAMAGUCHI M. Studies on buckwheat allergose. Report 2: clinical investigation on 169 cases with the buckwheat allergose gathered from the whole country of Japan. *Allerg Immunol (Paris)* 1974/1975;**20/21**: 457–465.
10. TAKAHASHI Y, ICHIKAWA S, AIHARA Y, YOKOTA S. Buckwheat allergy in 90,000 schoolchildren in Yokohama [in Japanese]. *Arerugi* 1998;**47**:26–33.
11. WIESLANDER G, NORBÄCK D. Buckwheat allergy among gluten sensitive persons in Sweden. *Advances in Buckwheat Research. Section IV: Allergenic properties. Seventh International Symposium on Buckwheat*, Winnipeg, Canada: 1998, pp. 26–30.
12. KOBAYASHI S. Different aspects of occupational asthma in Japan. In: *Occupational asthma*. New York: Van Nostrand Reinhold, 1980:229–256.
13. PARK HS, NAHM DH. Buckwheat flour hypersensitivity: an occupational asthma in a noodle maker. *Clin Exp Allergy* 1996;**26**:423–427.
14. CHOUDAT D, VILLETTE C, DESSANGES JF, et al. Occupational asthma caused by buckwheat flour. *Rev Mal Respir* 1997;**14**:319–321.
15. SCHUMACHER F, SCHMID P, WÜTHRICH B. Zur Pizokel-Allergie: ein Beitrag über die Buchweizenallergie [in German]. *Schweiz Med Wochenschr* 1993;**123**: 1559–1562.
16. DAVIDSON AE, PASSERO MA, SETTIPANE GA. Buckwheat induced anaphylaxis: a case report. *Ann Allergy* 1992;**69**: 439–440.
17. URISU A, KONDO Y, MORITA Y, et al. Identification of a major allergen of buckwheat seeds by immunoblotting methods. *Allergy Clin Immunol News* 1994;**6**:151–155.
18. PARK JW, KANG DB, KIM CW, et al. Identification and characterization of the major allergens of buckwheat. *Allergy* 2000;**55**:1035–1041.
19. ÅBECK D, BORRIES M, KUWERT C, STEINKRAUS V, VIELUF D, RING J. Food-induced anaphylaxis in latex allergy [in German]. *Hautarzt* 1994;**45**:364–367.
20. DE MAAT-BLEEKER F, STAPEL SO. Cross-reactivity between buckwheat and latex. *Allergy* 1998;**53**:538–539.