



Pattern of sensitization to PR-10 in Ukraine suggests a long period of potential tree pollen allergy

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Background: It is well known that the major allergens of PR-10 group, including birch (Bet v 1), hazel (Cor a 1.0103), alder (Aln g 1), and beech (Fag s 1), are the leading pollen allergen for trees of the Fagales order. The flowering period of these trees typically occurs from March to May, but climate change has influenced this pattern. Therefore, for pollen allergy prevention, it is crucial to consider the flowering period of Fagales trees and the patterns of combined sensitivity to PR-10 group allergens in population.

Method: Sensitization to tree pollen was studied using the data of molecular allergy sensitization in Ukraine obtained using ALEX2 test conducted from 2020 to 2022. The study included 20,033 Ukrainian patients aged 1 to 89 years. Pollen collection was performed using a volumetric method with a Burkard Hirst-type spore trap, installed at a height of 25 meters on the roof of Vinnytsia National Pirogov Memorial Medical University. Microscopic slides of collected pollen were stained and analyzed under a light microscope at 400x magnification. Statistical analysis was carried out using the European Aeroallergen Network tools and Excel 2013.

Results: Analysis of the ALEX2 sensitization database revealed that out of 20,033 individuals, 3,239 (16.17%) were sensitized to PR-10 group pollen allergens. Among them, 3,133 (96.73%) were sensitive to birch (Bet v 1), 2,585 (79.81%) to beech (Fag s 1), 2,243 (69.25%) to hazel (Cor a 1.0103), and 1,870 (57.73%) to alder (Aln g 1). It is noteworthy that sensitivity to birch allergen Bet v 1 was the most prevalent among the Fagales allergens. Considering this, we analyzed various possible combinations of sensitivity to PR-10 group allergens: 52.61% of individuals had combined sensitivity to all four allergens (Bet v 1+Aln g1+ Cor a 1.0103+Fag s 1), followed by 15.65% sensitive only to birch (Bet v 1), 13.49% sensitized to birch with hazel and beech (Bet v 1 +Cor a 1.0103+Fag s 1), and 8.86% sensitive to birch and beech (Bet v 1 + Fag s 1). The remaining 9.39% of people were sensitive to other combinations (ranging from 2.9% to 0.03%).

Attention should also be paid to the pollination season and combined sensitivity to PR-10 group allergens. All trees responsible for spread of PR-10 allergens bloom in spring, but the onset and end of pollination vary. In accordance with aerobiological data for Ukraine, hazel and alder bloom first (from mid-February to mid-April), followed by birch and oak, which bloom from late March to mid-May. It is also essential to consider the pollen of hornbeam and beech, which bloom in April. Thus, most people with sensitivity to this allergen group may potentially experience allergy symptoms from mid-February to the end of May.

Conclusion: Combined sensitivity to PR-10 allergens accounts for a significant period during which individuals experience allergy symptoms. Therefore, it is crucial to know for the patients their specific pattern of sensitivity to different allergens within the PR-10 group for the personal allergy prevention. Epidemiological data on sensitivity of patients can assist for the prevention of pollen allergy at the population level.

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