

The analysis of grass pollen season in northern Poland in 2017

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Abstract: This paper presents the course of the pollen season of grass (*Poaceae*) in Szczecin, Drawsko Pomorskie, Olsztyn, Bydgoszcz, Warsaw and Białystok in 2017. Grasses are typical wind-pollinated plants and the most important agent causing pollinosis in Europe. Seasonal Pollen Index (SPI) was estimated as the annual sum of daily average pollen concentrations. The highest, recorded airborne concentration of 132 pollen grains/m³ was noted in Warsaw on the 24th of June. The maximum values of seasonal pollen count occurred between of 9th June and 8th of July in all cities. The highest grass pollen allergen hazard occurred in 2017 in Warsaw, Szczecin, Drawsko Pomorskie and Olsztyn.

Key words: allergens, pollen count, grass, *Poaceae*, 2017

Introduction

Grass pollen is the major cause of pollinosis in many parts of the world. The grass pollen concentration at which clinical allergic symptoms can develop depends also on individual reactivity and show regional differentiations. In Poland, the people sensitive to *Poaceae* pollen developed the first disease symptoms when exposed to more than 20 g/m³. Symptoms were noted in all the subjects sensitized to grasses pollen at the concentration of approximately 50 g/m³ of air. During exposure to the concentration of 65 pollen grains per m³ the symptoms were acute [1]. All grass pollen types show a very high degree of cross-reactivity (the reaction between an antibody and an antigen that differs from the immunogen, mainly proteins). Grass pollen can also cross-react with food like beans, peas, cereals, peanut and fruit (melon, watermelon) as well as edible vegetables (carrot, celery) [2].

Aim

The aim of this work was to analyze the grass pollen concentrations in the air of Szczecin, Warsaw, Drawsko Pomorskie, Bydgoszcz, Olsztyn and Białystok in 2017.

Material and method

Measurements of airborne grasses pollen were carried out in Szczecin, Warsaw, Drawsko Pomorskie, Bydgoszcz, Olsztyn and Białystok in the year 2017.

The total pollen count over this period was expressed by the symbol SPI (Seasonal Pollen Index).

On the basis of literature data, the number of days with concentrations of the pollen of the grass family exceeding the threshold values at which the consecutive allergy symptoms develop were determined (tab. 1) [1].

Table 1. Characteristics of grass pollen season in 2017.

Features of pollen season	Szczecin	Warsaw	Drawsko Pomorskie	Bydgoszcz	Olsztyn	Bialystok
Seasonal Pollen Index (total)	3191	3439	3110	2920	3138	2364
Peak value and peak date	100 (2017-06-09)	132 (2017-06-24)	112 (2017-06-12)	93 (2017-06-20)	94 (2017-06-28)	93 (2017-07-08)
Days ≥ 50 g/m ³ [2]*	17	28	20	21	23	7

* Symptoms present in all examined patients.

Results and discussion

As the family *Poaceae* is represented by many taxa, the pollen seasons were very long. In 2016, in all the measurement points studied, the grass pollen season started between 10th and 21st of June and lasted 105–119 days, to the first decade of September [3]. In general the *Poaceae* pollen is present abundantly over most of the area of Poland from the half of May to the half of August [3].

The start of grass pollen season in 2017 occurred in the last week of May and it lasted to the beginning of September. In 2017 in northern Poland the maximum daily concentration was observed between 9th of June and 8th of July (fig. 1–3). In 2016 in most cities of central and northern Poland the dates of maximum concentrations were noted between 4th and 15th of June [3]. In this study the highest daily pollen count was noted in 2017 in Warsaw (132 g/m³), in Drawsko Pomor-

Figure 1. Grass pollen count in Szczecin and Warsaw in 2017.

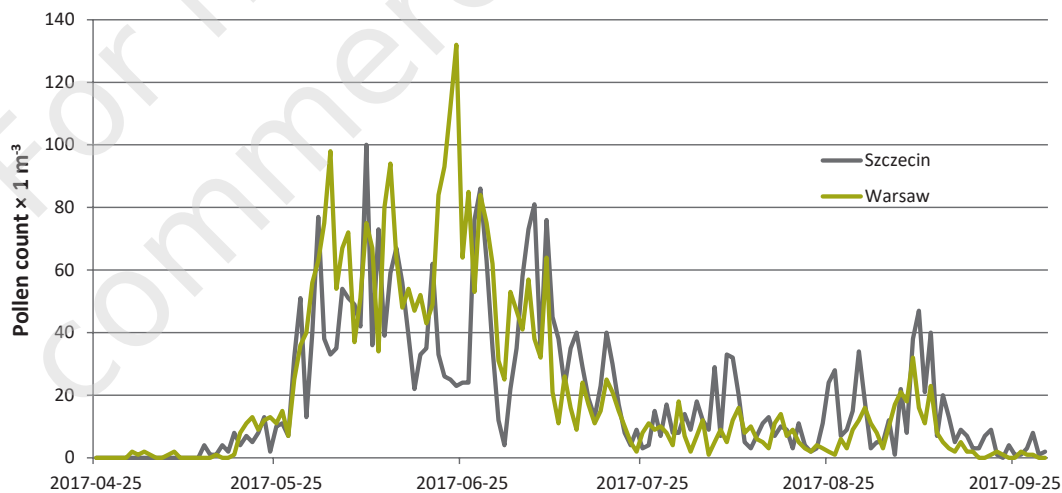


Figure 2. Grass pollen count in Drawsko Pomorskie and Bydgoszcz in 2017.

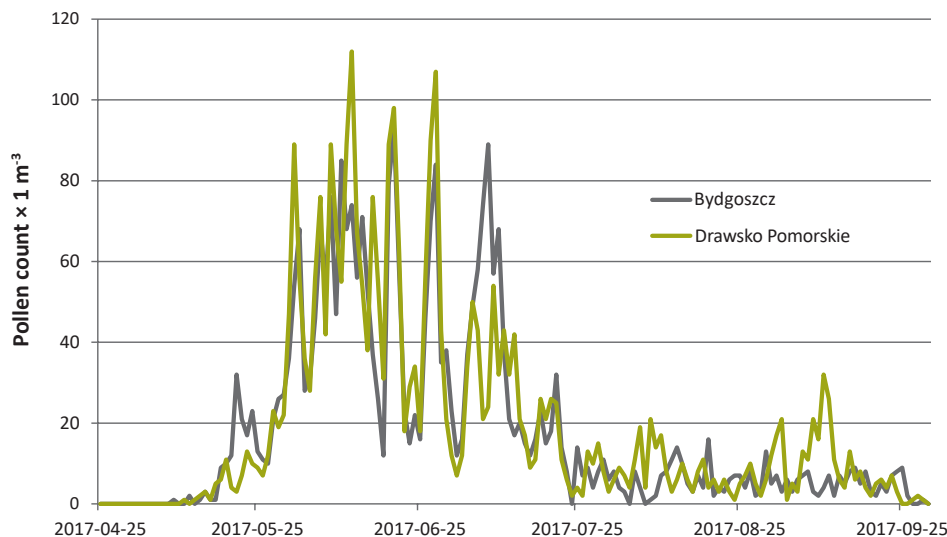
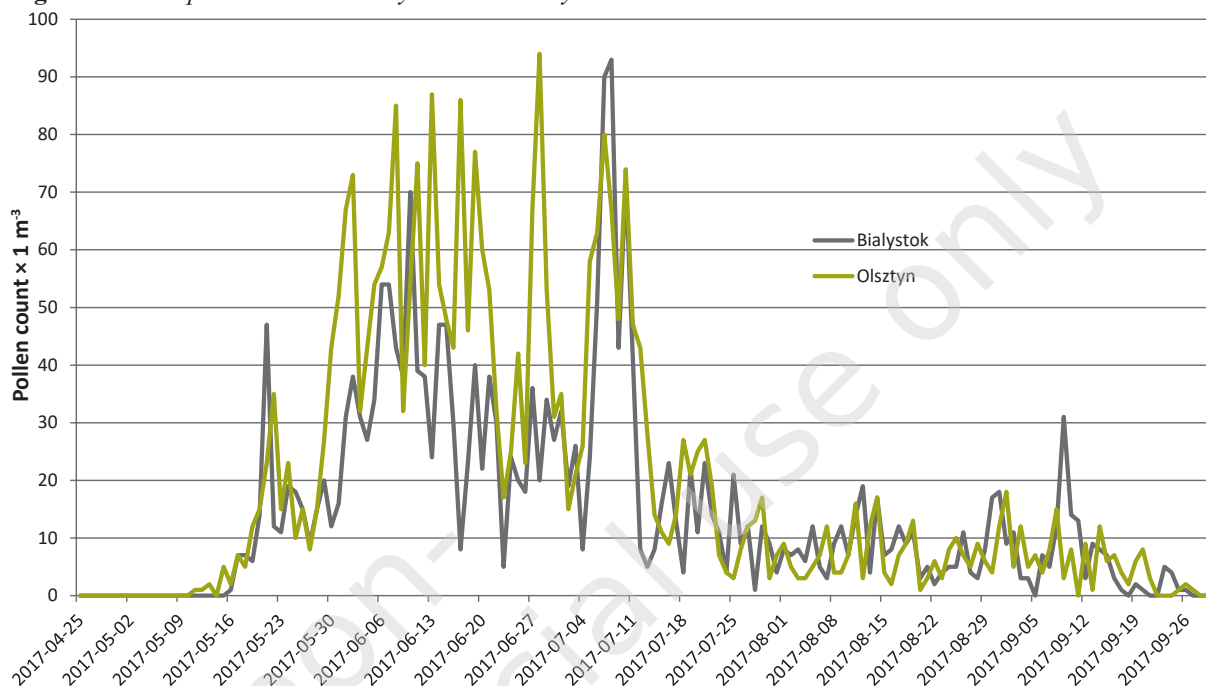


Figure 3. Grass pollen count in Białystok and Olsztyn in 2017.



skie (112 g/m³) and in Szczecin (100 g/m³) (tab. 1). The highest annual sum of grass pollen grains (SPI) was observed in Warsaw (3439), in Szczecin (3191) and in Olsztyn (3138).

The highest pollen concentration causing severe clinical symptoms (above 50 g/m³) was noted in Warsaw (28 days), in Olsztyn (23 days) and in Bydgoszcz (21 days) (tab. 1).

Conclusions

The start of grass pollen season in 2017 occurred in the last week of May and it lasted to the beginning of September.

The highest grass pollen allergen hazard occurred in 2017 in Szczecin, Drawsko Pomorskie and Warsaw. The highest pollen concentration causing severe clinical symptoms (above 50 g/m³) was noted in Warsaw (28 days), in Olsztyn (23 days) and in Bydgoszcz (21 days).

The updating of pollen calendars and accurate pollen announcements are important for efficient prophylaxis of pollen allergies.

References:

1. Rapiejko P, Stankiewicz W, Szczygielski K, Jurkiewicz D. Threshold pollen count necessary to evoke allergic symptoms. *Otolaryngol Pol* 2007, 61(4): 591-594.
2. Andersson K, Lindholm J. Characteristic and immunobiology of grass pollen allergens. *Int Arch Allergy and Immunol* 2003, 130: 87-107.
3. Puc M, Kotrych D, Rapiejko P et al. The analysis of grass pollen season in northern Poland in 2016. *Alergoprofil* 2016, 4(12): 186-189.

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Rapiejko P: 40%; and other Authors: 10% each.

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Ethics: The contents presented in this paper are compatible with the rules the Declaration of Helsinki, EU directives and standardized requirements for medical journals.

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