

# The analysis of birch pollen season in northern Poland in 2017

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**Abstract:** This paper presents the course of pollen season of birch in Białystok, Bydgoszcz, Drawsko Pomorskie, Koszalin, Olsztyn and Szczecin in 2017. Measurements were performed by the volumetric method (Burkard and Lanzoni pollen samplers). Pollen season was defined as the period in which 95% of the annual total catch occurred. Seasonal Pollen Index (SPI) was estimated as the annual sum of daily average pollen concentrations. Birch pollen season started first in Szczecin, on the 1<sup>st</sup> of April, lasted till the 9<sup>th</sup> of May and was the longest one in northern Poland. The highest recorded airborne concentration of 1575 pollen grains/m<sup>3</sup> was noted in Olsztyn on 10<sup>th</sup> of April. The maximum values of seasonal pollen count occurred between 9<sup>th</sup> and 10<sup>th</sup> of April in all monitoring sites. Birch pollen season of 2017 was much less intense than the one of 2016.

**Key words:** allergens, pollen count, birch, *Betula*

## Introduction

Birch pollen allergens, next to alder and hazel pollen allergens, are very common cause of pollinosis in Poland [1]. Birch is wind-pollinated and produce large amounts of light pollen grains of highly allergenic potential.

The threshold value for first clinical symptoms for *Betula* pollen grains for the majority of sensitized patients is under the exposure to the concentration of 20 pollen grains per 1 m<sup>3</sup> of air. Symptoms are usually noted in all subjects sensitized to birch pollen at the concentration of approximately 75 grains/m<sup>3</sup> of air [2].

## Aim

The aim of the study was to analyze birch pollen season of 2017 in northern Poland: Białystok,

Bydgoszcz, Drawsko Pomorskie, Koszalin, Olsztyn and Szczecin.

## Material and method

Measurements of airborne birch pollen were carried out with the use of volumetric method (Burkard and Lanzoni pollen samplers) in Białystok, Bydgoszcz, Drawsko Pomorskie, Koszalin, Olsztyn and Szczecin in the year 2017. Microscopic observations were performed on preparations obtained in a 7-day cycle with assessment of 24-hour periods. The pollen season was defined using the 95% method [3]. The total pollen count within this period was expressed by the SPI (Seasonal Pollen Index). On the basis of literature data, the number of days with concentrations of the pollen of the *Betula* genus exceeding the thresh-

old values at which the consecutive allergy symptoms develop were determined (tab. 1) [2].

**Table 1.** Characteristics of birch pollen season in northern Poland in 2017.

Features of pollen season	Białystok	Bydgoszcz	Drawsko Pomorskie	Koszalin	Olsztyn	Szczecin
Pollen season period by the 95% method (number of days)	2017-04-05–2017-05-08 (33)	2017-04-04–2017-08-08 (36)	2017-04-03–2017-05-09 (37)	2017-04-04–2017-05-11 (38)	2017-04-03–2017-05-07 (35)	2017-04-01–2017-05-09 (39)
Seasonal Polen Index (total)	2327	6384	7658	6859	7740	4814
Maximum pollen count (P/m <sup>3</sup> ) (date)	656 (2017-04-10)	1132 (2017-04-10)	1324 (2017-04-10)	986 (2017-04-10)	1575 (2017-04-10)	888 (2017-04-09)
Days number above threshold 20 P/m <sup>3</sup> [1]*	26	36	35	38	34	34
Days number above threshold 75 P/m <sup>3</sup> [1]**	7	27	26	29	25	18

\* First symptoms of allergy; \*\* symptoms present in all examined patients.

## Results and discussion

In 2017, the pollen season of birch determined using the 95% method, started within the first days of April (tab. 1), between 1<sup>st</sup> of April in North-West (Szczecin) and 6<sup>th</sup> of April in North-East (Białystok) and lasted until the first decade of May.

In majority of northern Poland cities (except Szczecin) the maximum daily concentration of birch pollen grains was reached within first week of the season, on the 10<sup>th</sup> of April. The highest daily birch pollen count was noted in Olsztyn (1575 g/m<sup>3</sup>) (tab. 1, fig. 5) and the highest annual sum of birch pollen grains (SPI) was observed also in Olsztyn (7740). In other cities the maximum concentrations ranged from only 656 P/m<sup>3</sup> in Białystok to 1324 P/m<sup>3</sup> in Drawsko Pomorskie (fig. 1–4, 6). Comparing with the results of pollen monitoring in southern Poland, the lowest maximum concentrations of birch pollen were recorded in Białystok [4]. In 2017, the total annual pollen sum was nearly 2–5-fold lower than in 2016 [5].

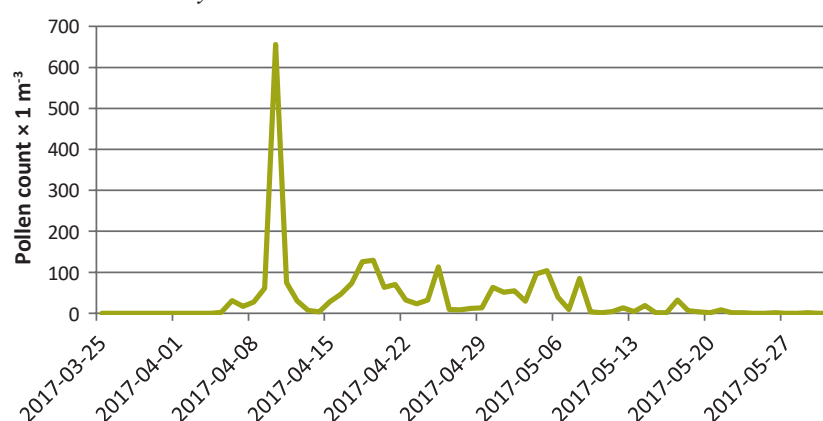
The number of days with concentration equal or higher than 20 P/m<sup>3</sup> was from 26 in Białystok up to 38 in Koszalin.

The comparison of birch pollen seasons with the previous year revealed that in 2017 birch pollen concentrations was much less intense than in 2016 [5]. However, when comparing the long-term data, the maximum birch pollen count in 2016 was one of the highest in all analyzed cities [5] (fig. 7).

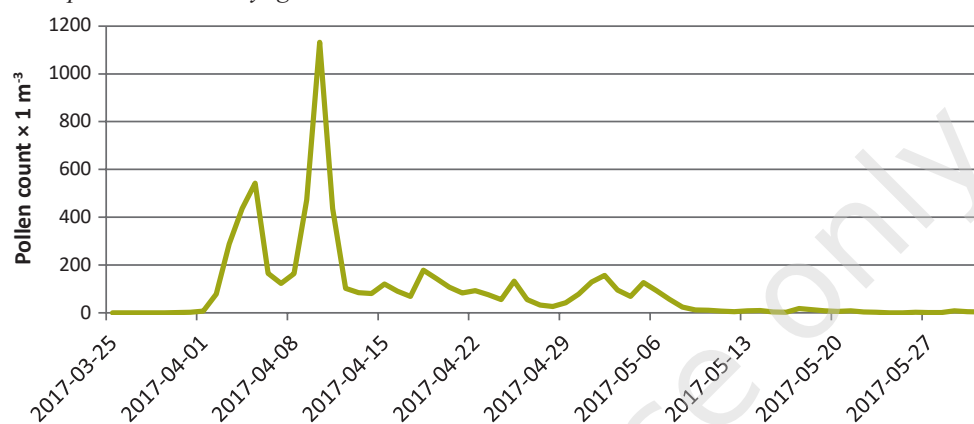
## Conclusions

Birch pollen season in the cities in northern Poland started within the first days of April (the earliest onset recorded in the western part, at the latest in the eastern part of the country). The end of the birch pollen season was noted within the first decade of May. In most cities birch pollen season was quite long and lasted 36 days on average. The maximum concentration of birch pollen in majority of the cities

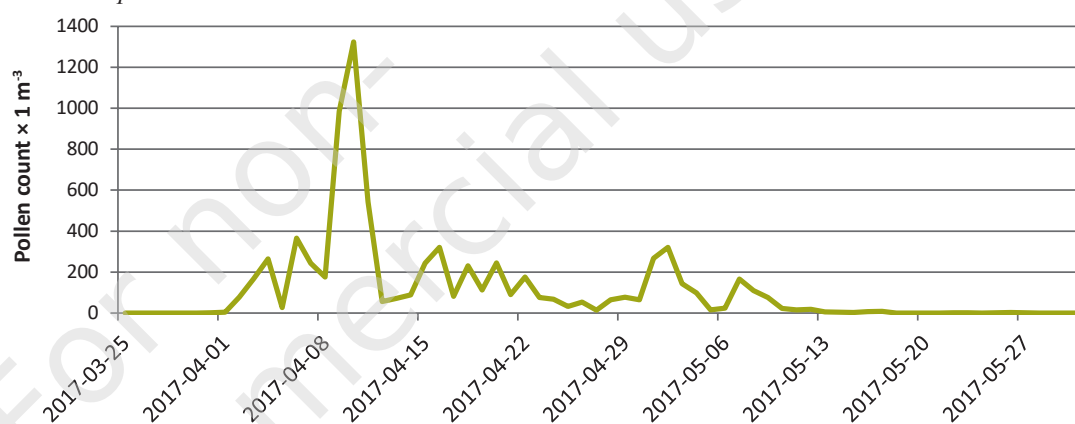
**Figure 1.** Birch pollen count in Białystok in 2017.



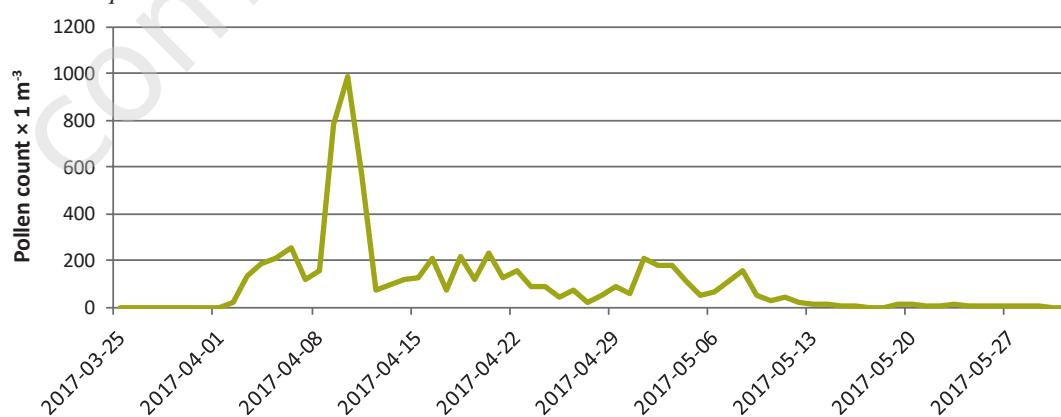
**Figure 2.** Birch pollen count in Bydgoszcz in 2017.



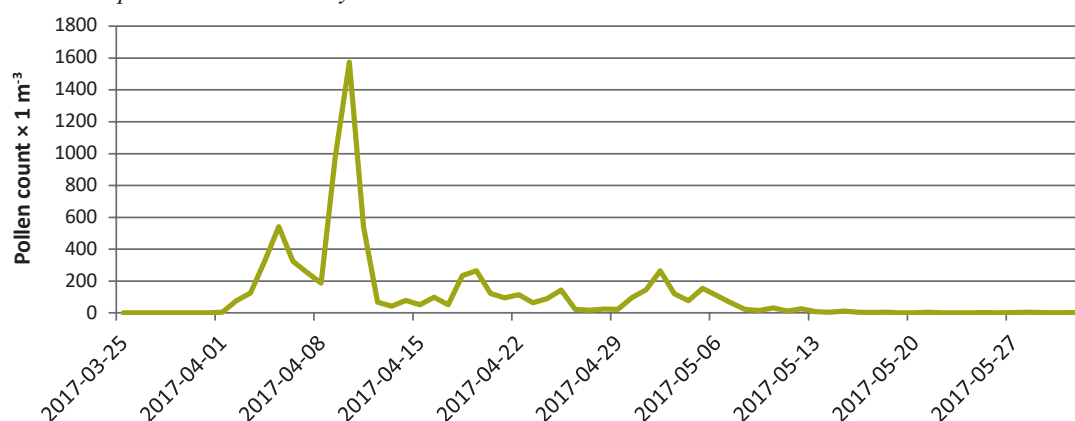
**Figure 3.** Birch pollen count in Drawsko Pomorskie in 2017.



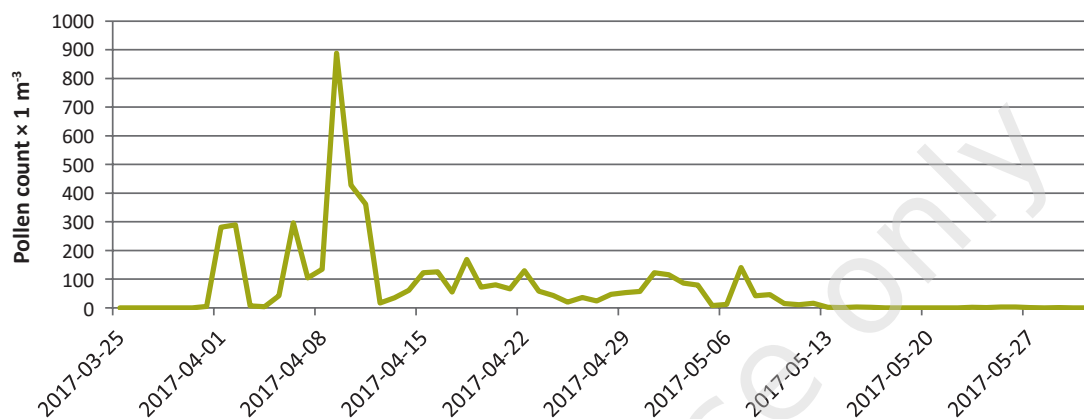
**Figure 4.** Birch pollen count in Koszalin in 2017.



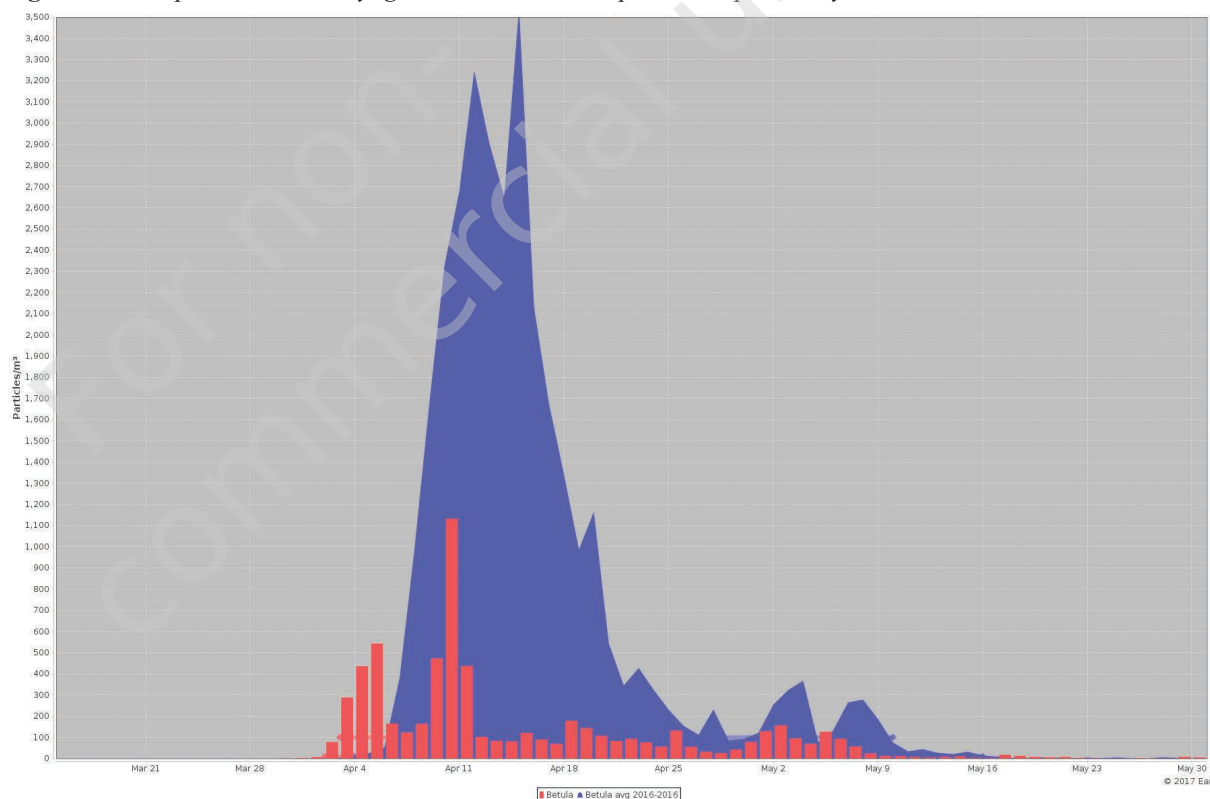
**Figure 5.** Birch pollen count in Olsztyn in 2017.



**Figure 6.** Birch pollen count in Szczecin in 2017.



**Figure 7.** Birch pollen count in Bydgoszcz in 2017 in comparison to previous years.



was noted on the same day – 10<sup>th</sup> of April. The highest daily pollen count, recorded in Olsztyn (1575 P/m<sup>3</sup>), was lower than in southern part of the country and much lower than the values reached in 2016.

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## Authors' contributions:

Lipiec A: 55%; Puc M: 10%; Siergiejkowski G: 10%; Świebocka EM: 5%; Sankowski Z: 5%; Kalinowska E: 5%; Rapiejko P: 10%.

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