Populus pollen in the air of selected Polish cities in 2018

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Abstract: This paper presents the course of poplar pollen season in selected Polish cities in 2018. The measurements were performed in Szczecin, Bydgoszcz, Olsztyn, Bialystok, Zielona Gora, Warsaw, Piotrkow Trybunalski, Lublin, Wroclaw, Opole, Sosnowiec and Cracow. Volumetric method with the use of Volumetric Spore Trap (Burkard, Lanzoni) was implemented. Pollen season was defined as the period in which 95% of the annual total catch occurred. Pollen season of poplar in 2018 started more then 30 days later in comparison to 2014. The pollen season started first in Cracow (March 20th). The highest daily pollen count was recorded in Wroclaw on April 11th (1104 P/m^3).

Key words: aeroallergens, pollen count, poplar (*Populus*), 2018

Poplar (*Populus sp.*) is a tree, in which the blooming period occurs at the end of March and April [1]. Pollen which is produced by male flowers reaches high concentration in the air [2–4]. In the highest moment of pollen season the maximum concentration can reach up to 2100 P/m^3, although near to blooming male trees the concentration of the pollen can reach even 270 000 P/m^3 [1, 5]. Poplar pollen is not very significant in allergology, because oversensitivity to it's allergens is rather small [6]. However, there is few scientific works pointing at clinical meaning of poplar allergens [7–9].

Aim

The aim of the study was to compare the poplar pollen concentration in the air in selected Polish cities: Szczecin, Bydgoszcz, Olsztyn, Bialystok, Zielona Gora, Warsaw, Piotrkow Trybunalski, Lublin, Wroclaw, Opole, Sosnowiec and Cracow in 2018.

Material and method

In 2018, the measurements of the pollen concentration in the study sites were performed with the volumetric method using Burkard and Lanzoni pollen

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samplers. Microscopic observations were performed on preparations obtained in a 7-day cycle with assessment of 24-hour periods. The length of the poplar pollen seasons was determined with the 95% method. Pollen concentrations were expressed as the number of pollen grains in 1 m^3 of air per day (P/m^3). The course of the pollen seasons in each city is shown in the graphs (fig. 1–6).

The results

The pollen season of poplar in 2018 determined with the 95% method began in the third decade of March in most of analyzed cities: Bydgoszcz, Olsztyn, Zielona Gora, Warsaw, Piotrkow Trybunalski, Lublin, Opole and Sosnowiec (tab. 1). The pollen season started first in Cracow – March 20th. In Wroclaw, Szczecin and Bialystok the pollen season started unusually late – not until the beginning of April. In comparison to 2014 the beginning of poplar pollen season was belated almost a month [10]. The length of pollen seasons fluctuated between 14 days in Wroclaw to 29 days in Olsztyn (tab. 1).

Maximum daily concentration of *Populus* pollen in analyzed cities in 2018 were diversified. The highest concentration per 24 hours – 1104 P/m^3 occurred in Wroclaw. The lowest in Cracow – 32 P/m^3. In the rest of the cities, maximal seasonal poplar pollen concentration reached from 65 to 470 P/m^3 (fig. 1–6). The highest concentration of poplar pollen was between April 10th and 14th in most of the cities. Earlier – between April 5th and 9th only in Cracow and Lublin (tab. 1). The number of days with very high concentration of pollen grains (above 100 P/m^3) amounted to 9 in Zielona Gora and 6 – in Wroclaw and Opole (tab. 1).

The highest annual count of poplar pollen grains in 2018 was recorded in Wroclaw (4796 pollen grains) and Zielona Gora (3010 pollen grains). The lowest – in Cracow (266 pollen grains). In remaining cities the SPI ranged between 438 pollen grains in Bialystok and 1790 pollen grains in Opole. In 2009 in the majority of analyzed cities the maximal concentration count of pollen and the annual amount were higher than in 2018, but in 2014 lower than in 2018 [10].

The danger caused by poplar pollen allergens in 2018 was increased in Zielona Gora, Opole and Wroclaw. In those cities, the number of days with the pollen concentration above 50 P/m^3 was the highest (tab. 1). In Zielona Gora 12 days, in Opole – 11, and in Wroclaw 10.

Conclusions

The poplar pollen seasons in 2018 in analyzed cities began sooner comparing to 2009 [3], but more than a month later comparing to 2014 [10].

The start of poplar pollen season in 2018 occurred in the third decade of March. The maximum concentrations of poplar pollen in majority of the cities were noted between April 10th–14th, only in Cracow and Lublin in the beginning of April.

Table 1. *Characteristics of Populus pollen season in 2018.*

Site	Pollen season period by the 95% method	Maximum pollen count (P/m^3) (date)	Seasonal Pollen Index SPI (total)	Length of the pollen season (day)	Days number above threshold 50 P/m^3	Days number above threshold 100 P/m^3
Szczecin	4.04–20.04	470 (12.04)	1662	17	8	4
Bydgoszcz	30.03–19.04	112 (17.04)	660	21	4	1
Olsztyn	25.03–22.04	87 (14.04)	777	29	6	0
Bialystok	3.04–19.04	65 (14.04)	438	17	3	0
Zielona Gora	29.03–19.04	425 (12.04)	3010	22	12	9
Warsaw	30.03–19.04	156 (13.04)	951	21	6	3
Piotrkow Trybunalski	27.03–20.04	232 (12.04)	1218	25	8	4
Lublin	30.03–15.04	296 (9.04)	749	17	3	2
Wroclaw	1.04–14.04	1104 (11.04)	4796	14	10	6
Opole	26.03–18.04	266 (10.04)	1790	24	11	6
Sosnowiec	28.03–23.04	323 (10.04)	1177	27	6	3
Cracow	20.03–13.04	32 (5.04)	266	16	0	0

Figure 1. *Poplar pollen count in Szczecin and Bydgoszcz in 2018.*

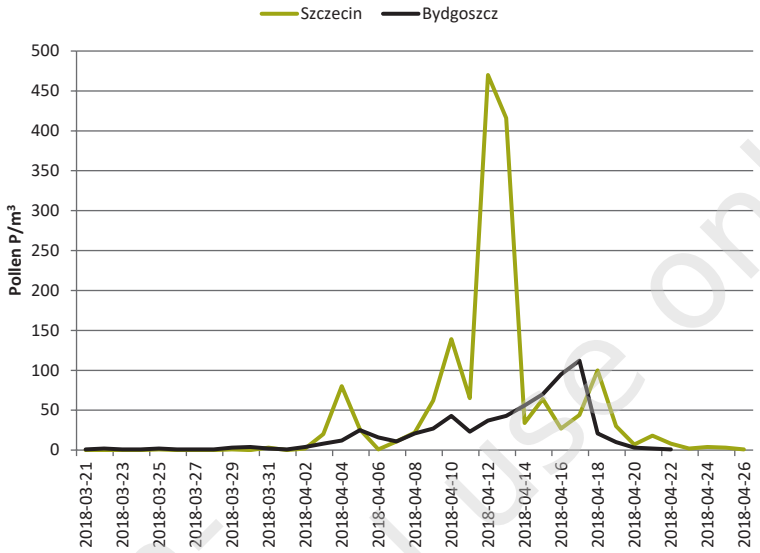


Figure 2. *Poplar pollen count in Olsztyn and Bialystok in 2018.*

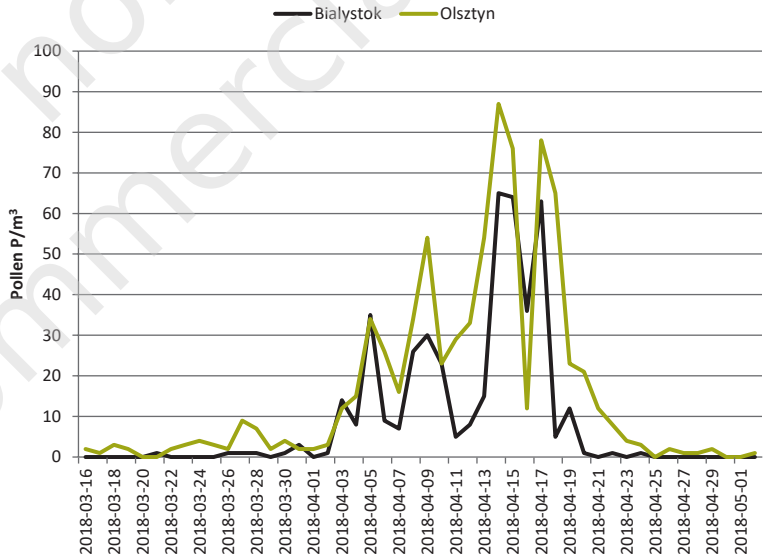


Figure 3. *Poplar pollen count in Zielona Gora and Warsaw in 2018.*

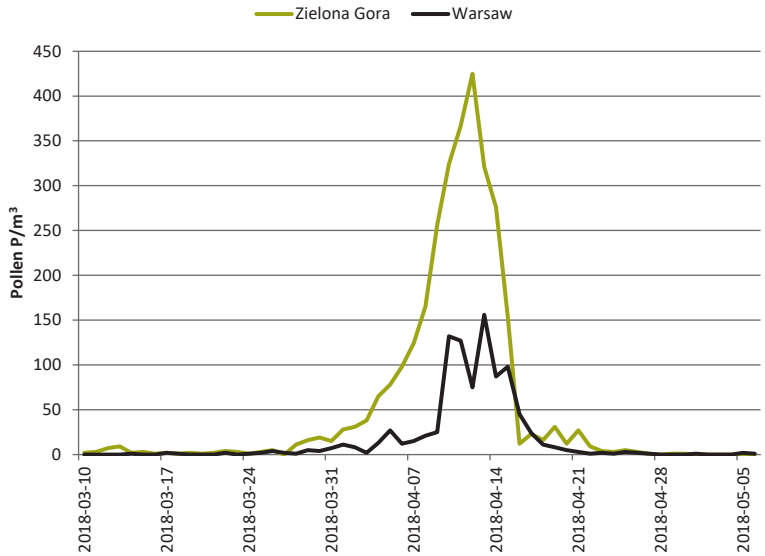


Figure 4. *Poplar pollen count in Piotrkow Trybunalski and Lublin in 2018.*

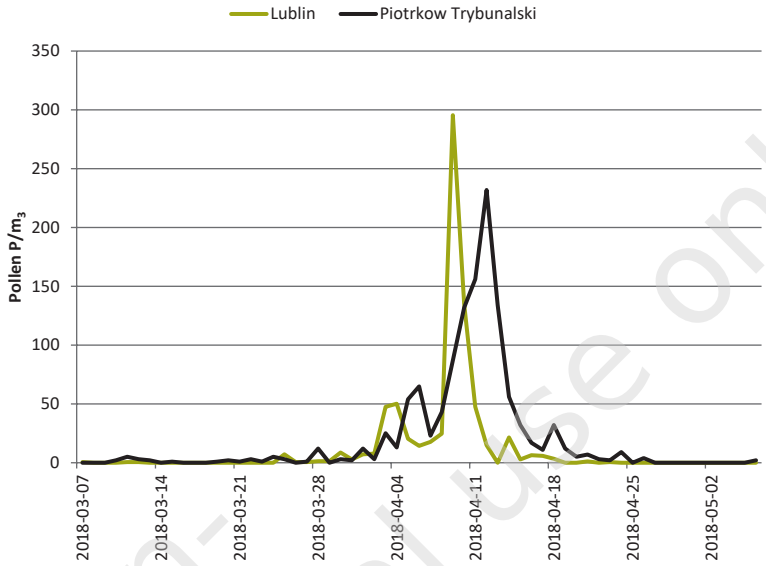


Figure 5. *Poplar pollen count in Wroclaw and Opole in 2018.*

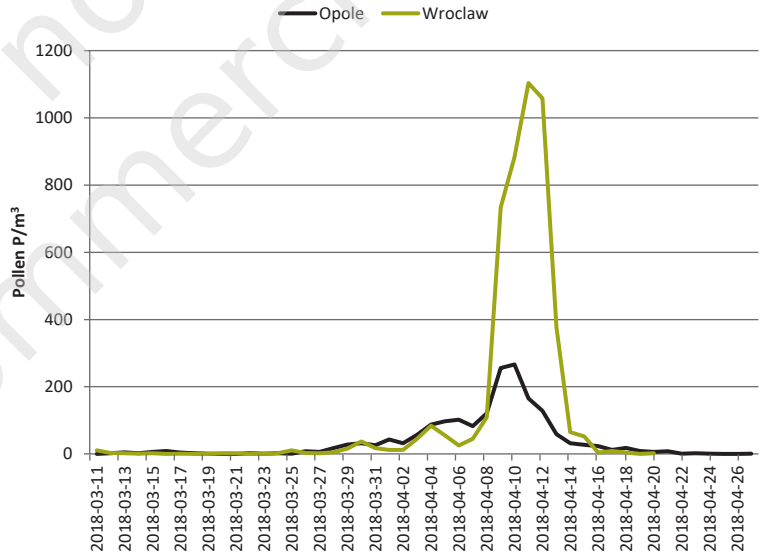
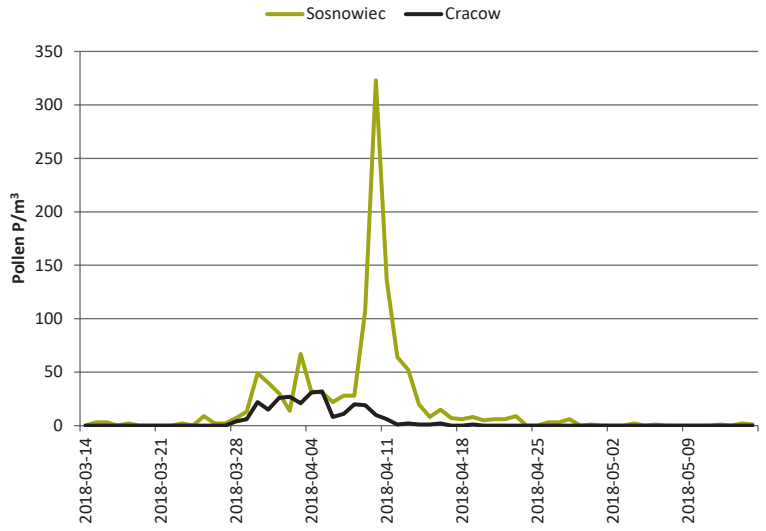


Figure 6. *Poplar pollen count in Sosnowiec and Cracow in 2018.*



The highest concentration of poplar pollen were registered in Wroclaw (1104 P/m^3), the lowest – in Cracow (32 P/m^3).

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