Corylus pollen season in southern Poland in 2016

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Abstract: The aim of the study was to compare the hazel pollen season in 2016 in Zielona Gora, Opole, Wroclaw, Sosnowiec, Cracow, Lublin, and Guciow (Roztocze National Park). Due to the mild winter, the hazel pollen season in Zielona Gora and Opole began very early, i.e. in the third decade of December 2015. In the other cities, the onset of the pollen season was noted between 30th January and 7th February. In a majority of the cities, the maximum daily pollen concentrations were recorded in the period between 7th and 10th February. The highest seasonal peak was reported from Lublin and the lowest – in Guciow and Wroclaw. The highest risk of allergy related to the persistence of high concentrations of airborne hazel pollen was noted for Zielona Gora, Lublin, and Cracow.

Key words: aeroallergens, pollen concentration, hazel (*Corylus*), 2016

Hazel usually flowers between January and March; hence pollen grains of this taxon are the first to appear in the air of all regions of Poland [1]. In January and February, symptoms associated with allergic reactions, i.e. sneezing, runny nose, irritated mucous membranes and headaches, are often interpreted as a cold. Therefore, allergologists' and patients' attention should be drawn to the possibility of an early onset of hazel pollen seasons, in particular after a mild winter [2] or in climate change conditions [3].

Patients presenting with allergic reaction to hazel pollen can also exhibit sensitivity to birch, hornbeam, oak, and beech pollen [4, 5]. Allergic cross-reactions may also occur after consumption of hazelnuts [6]. The first symptoms of allergy in individuals sensitive to hazel pollen may develop at air-borne concentrations of 35 pollen grains per m^3. In turn, 80 grains/m^3 cause symptoms in all allergic patients and severe symptoms are recorded at a concentration exceeding 150 grains/m^3 [7].

Aim

The aim of the study was to compare the hazel pollen concentration in the air of selected cities in southern Poland and in Roztocze National Park in 2016.

Material and method

Measurements of air-borne concentrations of hazel pollen were carried out in Zielona Gora, Opole, Wroclaw, Sosnowiec, Cracow, Lublin, and Guciow

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(Roztocze National Park). Aeroplankton samples were collected with the volumetric method using Burkard or Lanzoni pollen samplers. Microscopic observations were performed on preparations obtained in a 7-day cycle with assessment of 24-hour periods. Pollen concentrations were expressed as the number of pollen grains in 1 m^3 of air per day (P/m^3). The length of the hazel pollen seasons was determined with the 95% method.

Results and discussion

The onset of the pollen season in 2016 was recorded in several Polish cities exceptionally early, i.e. in the last decade of December 2015: Zielona Gora, Opole (tab. 1). In the other cities where the investigations were conducted, the season onset was noted between 30th January and 7th February. The latest date was recorded for the beginning of the hazel pollen season in the Roztocze National Park (tab. 1). The end of the pollen season was noted between the 14th and 28th March in a majority of the measurement sites and in April (4.04, 14.04) in Lublin and Guciow.

The highest daily pollen amount was recorded in Lublin (274 P/m^3), while the lowest concentrations were noted in Guciow (36 P/m^3) and Wroclaw (71 P/m^3). The highest hazel pollen concentrations were detected in the first decade of February (7–10) in a majority of the analysed cities and on 22nd February in Lublin and 13th March in Guciow (tab. 1, fig. 1–7). The highest risk of high concentrations of hazel pollen was noted in Zielona Gora (12 days) and Opole, Lublin, and Cracow (7–8 days). A pollen concentration of at least 80 P/m^3 persisting over 4 days

Table 1. *Characteristics of Corylus pollen season in 2016.*

Site	Pollen season period by the 95% method	Maximum pollen count (P/m^3) date	Annual pollen sum	Days number above threshold		
				35 P/m^3	80 P/m^3	150 P/m^3
Zielona Gora	27.12–17.03	132 8.02 and 10.02	1381	12	4	0
Opole	24.12–22.03	92 8.02	1067	8	2	0
Wroclaw	2.02–28.03	71 7.02	700	4	0	0
Sosnowiec	2.02–28.03	94 9.02	568	4	1	0
Cracow	30.01–14.03	176 7.02	1013	7	3	1
Lublin	6.02–04.04	274 22.02	1208	8	3	1
Guciow	7.02–14.04	36 13.03	153	1	0	0

Figure 1. *Hazel pollen count in Zielona Gora in 2016.*

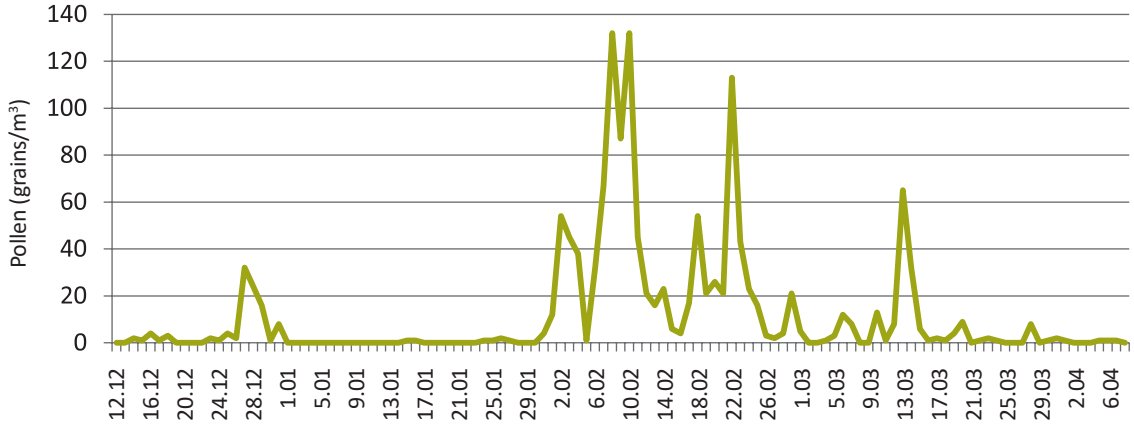


Figure 2. *Hazel pollen count in Opole in 2016.*

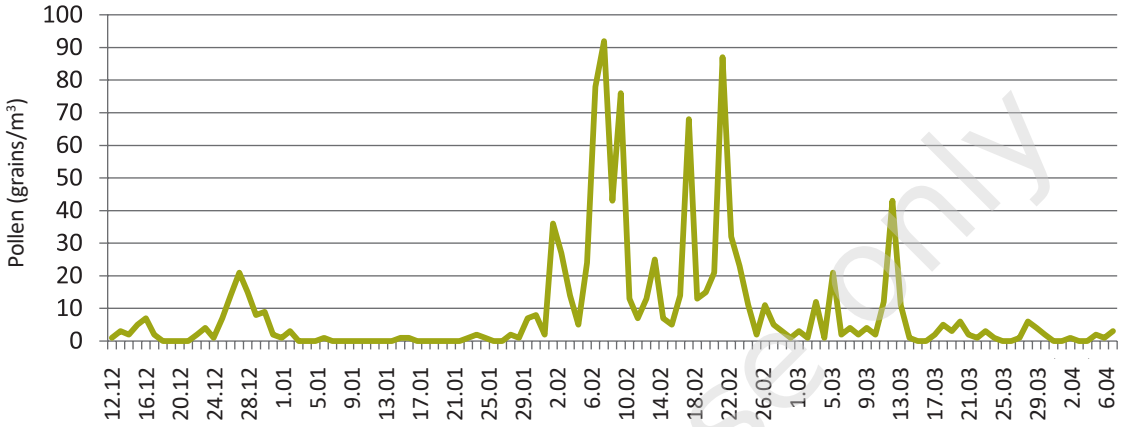


Figure 3. *Hazel pollen count in Wroclaw in 2016.*

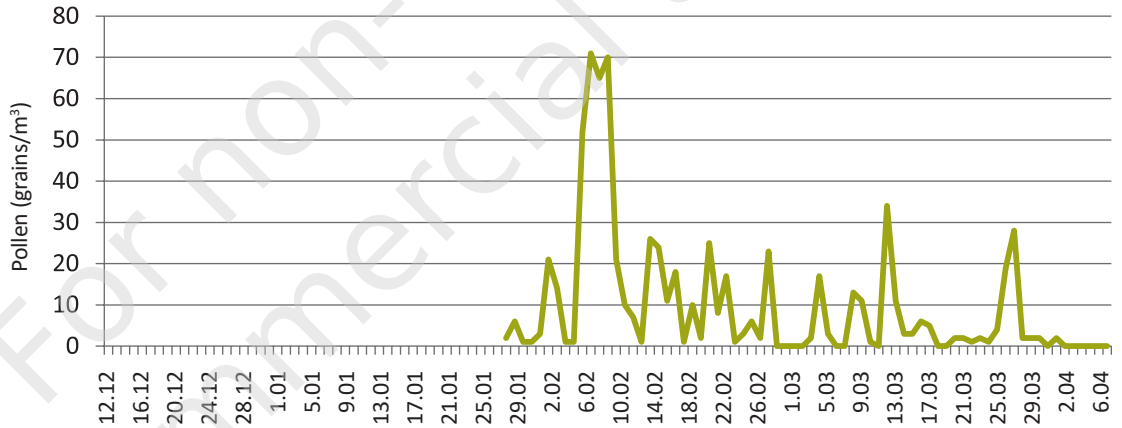
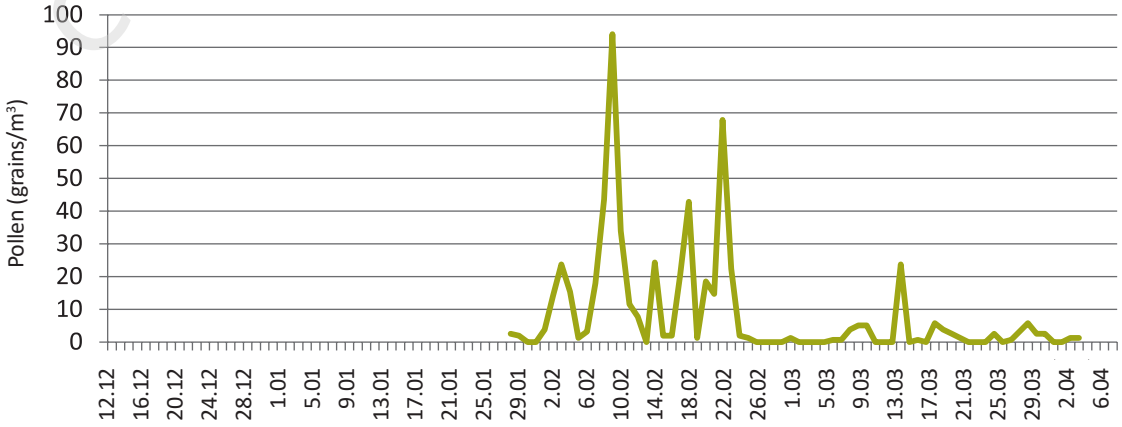


Figure 4. *Hazel pollen count in Sosnowiec in 2016.*



was recorded in Zielona Gora, 3 days in Cracow and Lublin, 2 days in Opole, and 1 day in Sosnowiec. Pollen content exceeding 150 P/m³ persisted for 1 day in Cracow and Lublin.

The highest annual pollen sums were recorded in Zielona Gora and Lublin: 1381 and 1208, respectively. They were similarly high in Opole and Cracow.

The annual totals and maximum concentrations of hazel pollen in 2016 were substantially higher in 2016 in the analysed sites than in 2015. They exhibited a similar level only in Lublin [8]. The extremely low annual total of pollen grains noted in Guciow is similar to those recorded in Poznan in 2001–2003 [2]. Our investigations based on meteorological observa-

Figure 5. *Hazel pollen count in Cracow in 2016.*

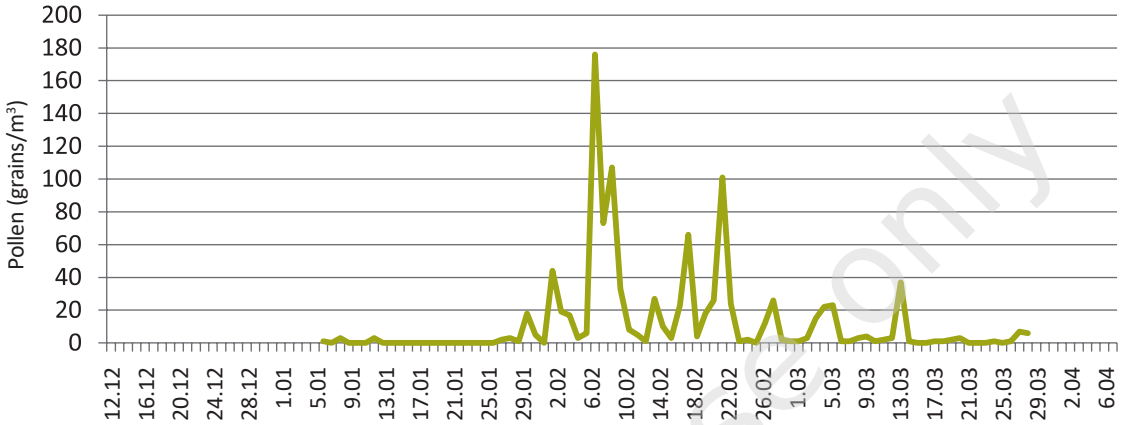


Figure 6. *Hazel pollen count in Lublin in 2016.*

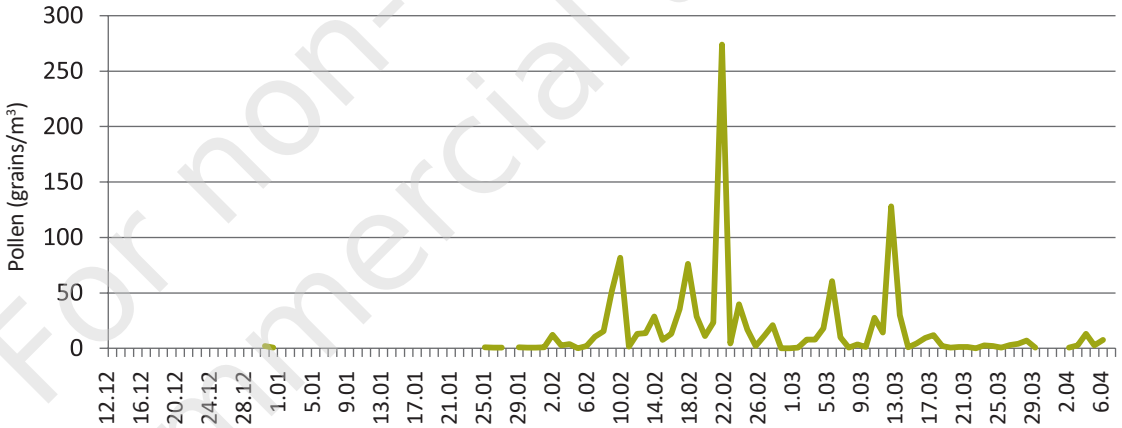
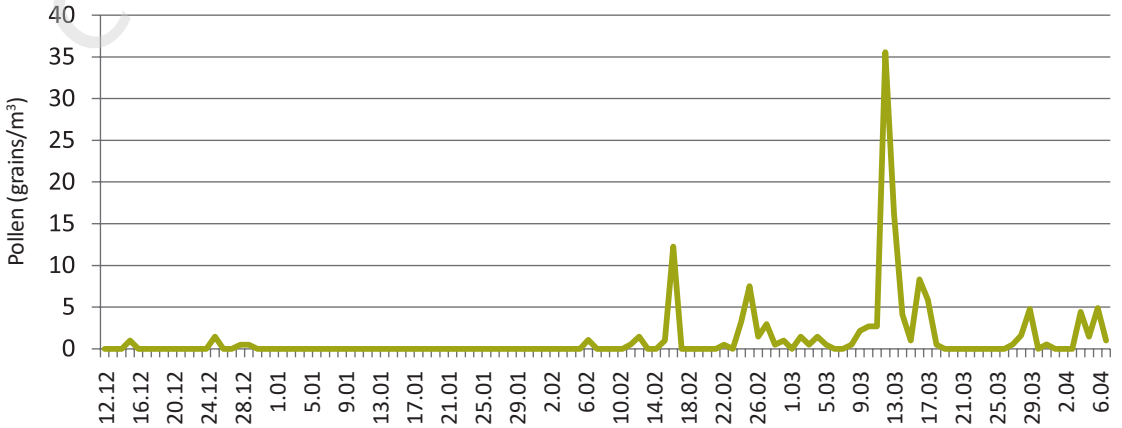


Figure 7. *Hazel pollen count in Guciow (Roztocze) in 2016.*



tions indicates that 2–3°C lower temperatures prevail in Guciow than in the surroundings of Lublin in early spring, which may be related to the terrain features and may result in less abundant flowering and a longer flowering period. The differences in the number of recorded grains in Lublin and Guciow, which are situated at a distance of ca. 100 km, may be associated with the low number of hazel specimens, as observed previously in the study area.

Conclusions

In 2016, the hazel pollen season began as early as in the third decade of December of the previous year

in Zielona Gora and Opole and between 30th January and 7th February in the other cities.

The maximum concentrations of hazel pollen in a majority of the cities were noted between 7th and 10th February and on later dates in Lublin and Guciow.

The annual pollen sums in 2016 were higher than those in the previous year, with the exception of Lublin, where they exhibited at a similar value.

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