Mugwort pollen season in central and northern Poland in 2015

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Abstract: The aim of the study was to compare pollen season of mugwort in Bialystok, Bydgoszcz, Drawsko Pomorskie, Olsztyn, Piotrkow Trybunalski, Szczecin and Warsaw. Measurements of pollen concentrations were performed with the volumetric method; Burkard or Lanzoni pollen sampler. The pollen season of mugwort started first in Bialystok (on the 8th of July). Maximum pollen concentrations were observed in all measurement sites in the period between 7th August and 18th August. The highest concentration of mugwort pollen and the highest annual sum of pollen grains concentrations in the air were recorded in Bydgoszcz, Drawsko Pomorskie and Olsztyn.

Key words: aeroallergens, pollen concentration, mugwort (*Artemisia*), 2015

Mugwort pollen grains contain allergens, which are one of the most common causes of pollen allergy in Poland [1]. In many countries, double sensitization to mugwort and ragweed is common, and because of the overlapping flowering periods of the 2 plants, it is not possible to diagnose the primary sensitizing allergen source [2]. Therefore it is very important to monitor the concentration of pollen in the atmosphere and to evaluate of clinical symptoms in patients at the same time. First symptoms in patients allergic (in Poland) to mugwort were visible during exposure to the concentration of 30 pollen grains in 1 m^3 of air (25% subjects sensitised to mugwort pollen) [3]. Symptoms were noted in all the subjects sensitized to mugwort pollen at the concentration of approximately 55 grains/m^3 of air [3]. During exposure to the concentration of 70 pollen grains per m^3 the symptoms were severe symptoms [3]. Several hours' exposure to mugwort pollen concentration exceeding 140 grains/m^3 cause dyspnoea in some patients [3].

Aim

The aim of the study was to compare the mugwort pollen concentrations in the air of in Bialystok, Bydgoszcz, Drawsko Pomorskie, Olsztyn, Piotrkow Trybunalski, Szczecin and Warsaw in 2015.

Material and method

Measurements of airborne mugwort pollen were carried out in Bialystok, Bydgoszcz, Drawsko

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Pomorskie, Olsztyn, Piotrkow Trybunalski, Szczecin and Warsaw. The pollen counts were recorded by a Hirst pollen trap (VPPS 2000; Lanzoni S.r.l., Italy and Burkard Ltd., England). Flow rate was fixed and provided by an external vacuum pump (10 l/min), and the speed of the trapping surface was 2 mm/hour. The Hirst-type sampler provides daily pollen trappings on a sticky tape, which is transferred to microscope slides. Slides are stained with fuchsin and are read with the use of an optical microscope. Microscopic slides were made in a 7-day cycle with assessment of 24-hour periods [4]. The results were expressed as a number of pollen grains in 1 m^3 of air per day (P/m^3). Seasonal Pollen Index (SPI) was estimated as the annual sum of daily average pollen concentrations. The length of the mugwort pollen season was determined with the 98% method.

Results and discussion

In 2015, the mugwort pollen season started between 8th and 16th July and persisted until late August. In the majority of the cities in central and northern Poland, periods of maximum concentrations were noted between 8th and 16th July, the earliest in Bialystok on 8th July (tab. 1, fig. 1–7). The risk of allergy associated with the persistence of high levels of mugwort pollen (above 55 P/m^3) was the greatest in Drawsko Pomorskie and Olsztyn (4 days) and in Bydgoszcz (3 days). Pollen concentration causing severe clinical symptoms (above 70 P/m^3) was noted in Bydgoszcz (2 days on 7th and 9th August) and Drawsko Pomorskie (1 day on 10th August). The highest daily pollen count was noted in Bydgoszcz (79 P/m^3) (tab. 1).

The highest annual sum of mugwort pollen grains (Seasonal Pollen Index) was recorded in Drawsko Pomorskie (1203) and it was over 2 times higher than in Bialystok (618) and Szczecin (643).

The comparison of mugwort pollen seasons in previous years revealed that in 2015 mugwort pollen concentrations in Szczecin were lover than in 2014 [5]. In contrast, the mugwort pollen season in Bydgoszcz and Piotrkow Trybunalski in 2015 was characterised by substantially higher pollen concentrations than in 2014 [5]. The course of mugwort pollen season and the mugwort pollen count in 2015 in Warsaw were similar to those recorded in 2014 [5].

Conclusions

The highest daily pollen concentration and the highest annual sum of mugwort pollen grains were recorded in Bydgoszcz, Drawsko Pomorskie and Olsztyn.

The highest risk of allergy associated with pollen counts exceeding the threshold value was noted in central and northern Poland in Drawsko Pomorskie and Bydgoszcz.

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Table 1. *Characteristics of mugwort pollen season in 2015.*

Station	Start (date)	Peak day (date)	Peak value	End (date)	Total	Days ≥ 30 g/m^3	Days ≥ 55 g/m^3
Bialystok	8.07.2015	12.08.2015	42	26.08.2015	618	2	0
Bydgoszcz	13.07.2015	7.08.2015	79	26.08.2015	1140	15	3
Drawsko Pom.	14.07.2015	10.08.2015	76	31.08.2015	1203	18	4
Olsztyn	12.07. 2015	7.08.2015	63	2.09.2015	1084	14	4
Piotrkow Tryb.	15.07.2015	4.08.2015	67	26.08.2015	924	12	1
Szczecin	ND	18.08.2015	63	ND	643	8	1
Warsaw	16.07.2015	10.08.2015	55	26.08.2015	848	10	1

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Figure 1. *Mugwort pollen count in Bialystok in 2015.*

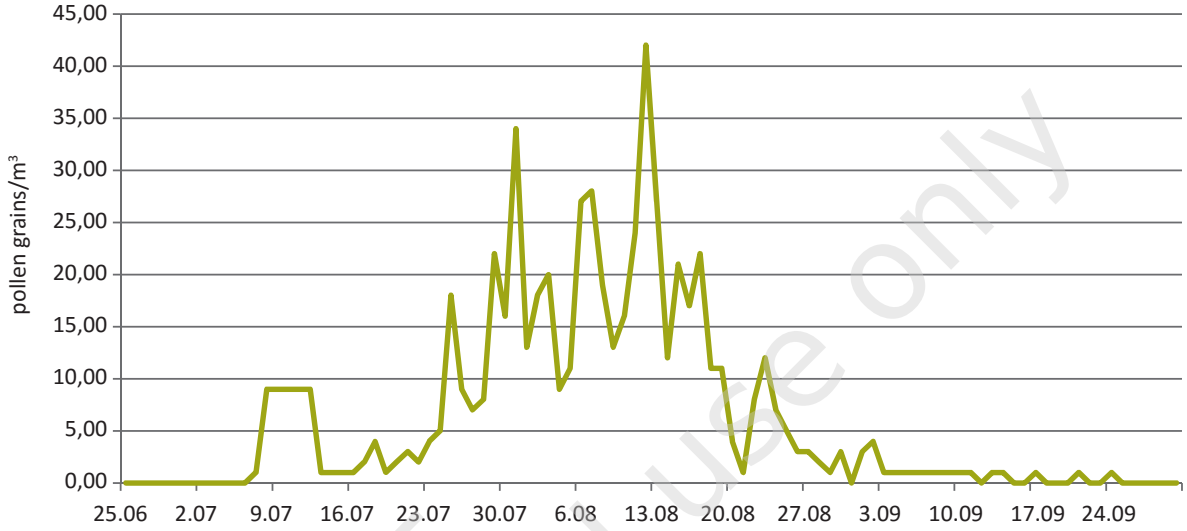

Figure 2. *Mugwort pollen count in Bydgoszcz in 2015.*

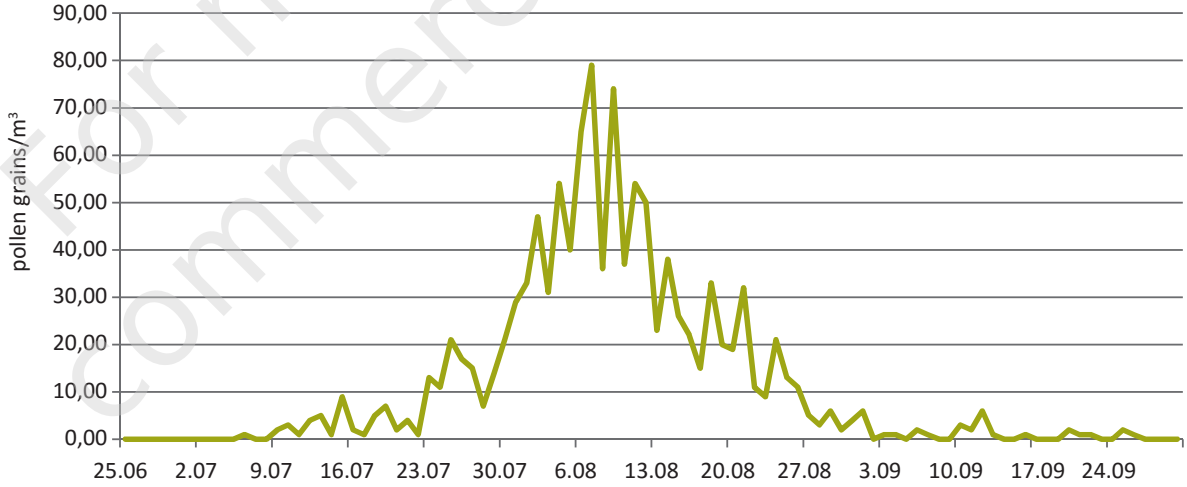

Figure 3. *Mugwort pollen count in Drawsko Pomorskie in 2015.*

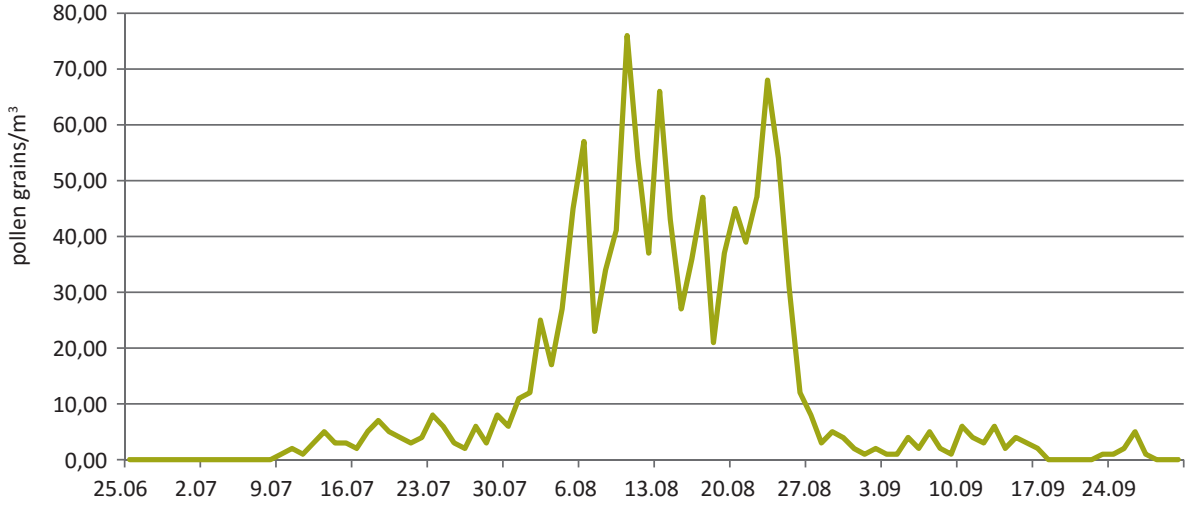

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Figure 4. *Mugwort pollen count in Olsztyn in 2015.*

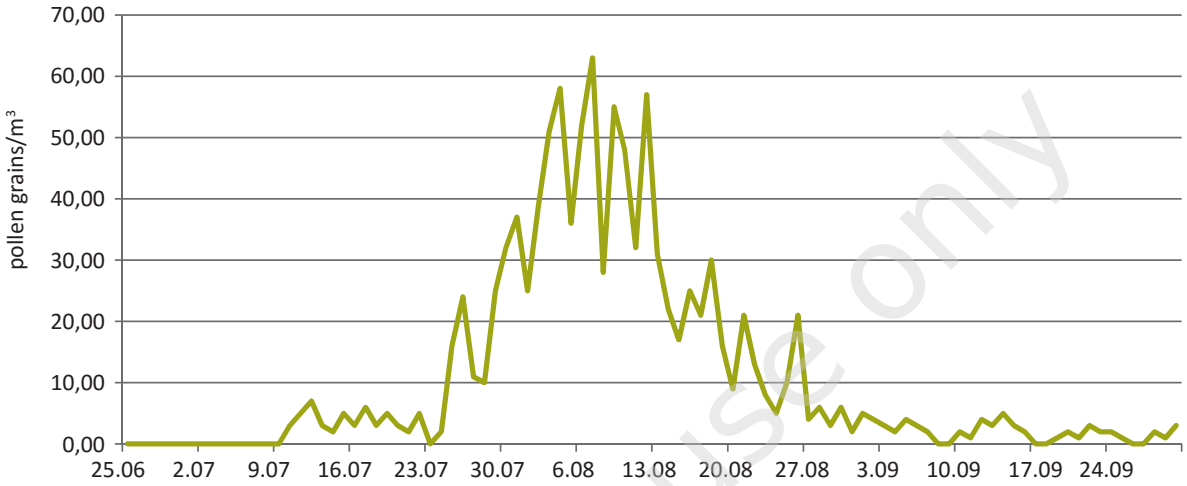

Figure 5. *Mugwort pollen count in Piotrkow Trybunalski in 2015.*

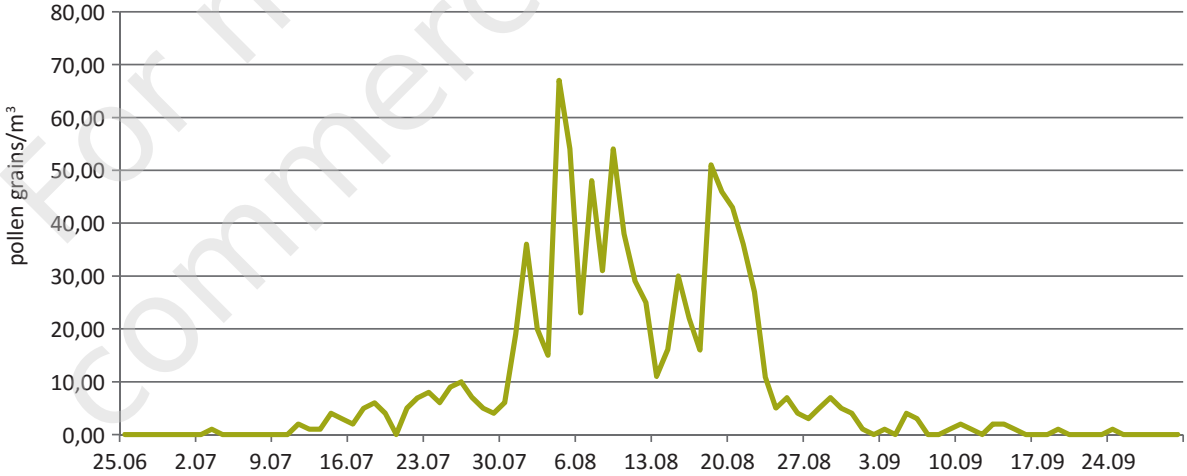

Figure 6. *Mugwort pollen count in Szczecin in 2015.*

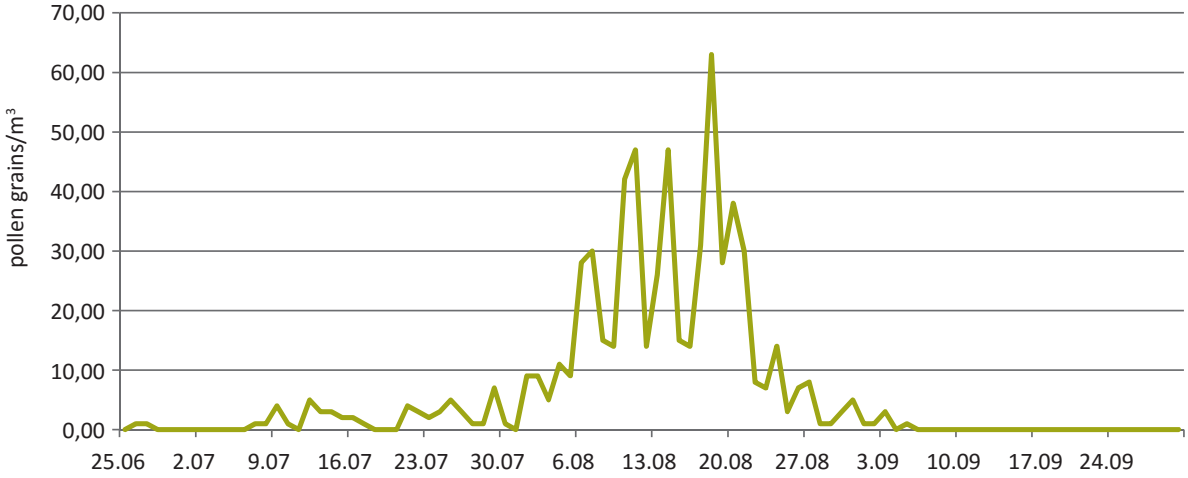

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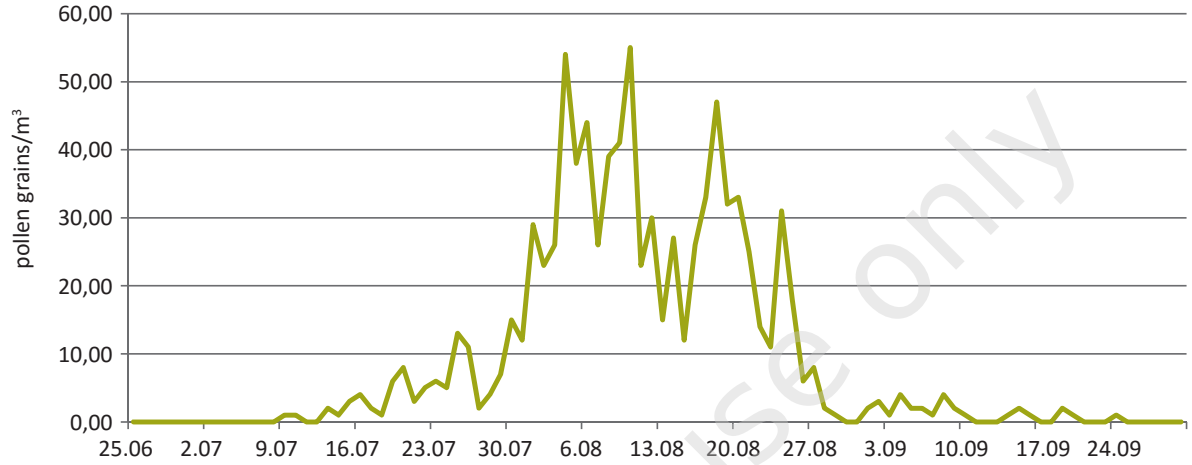
Figure 7. *Mugwort pollen count in Warsaw in 2015.*



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