Alternaria spores in the air of southern Poland cities in 2016

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Abstract: This paper presents the course of the spore season of Alternaria in Cracow, Sosnowiec, Opole, Piotrków Trybunalski, Wrocław, Zielona Góra in 2016. Measurements were performed by the volumetric method (Lanzoni and Burkard). Alternaria spore season was defined as the period in which 90% of the annual total catch occurred. The Alternaria season started first in Opole on the 5th May and lasted till the 22nd June in Cracow and Wrocław. The highest airborne concentration of 1231 Alternaria spores × m^{-3} was noted in Zielona Góra on the 6th July. The highest annual sum of Alternaria spores (SSI) was observed also in Zielona Góra (17 776 spores).

Key words: aeroallergens, spores, mould, Alternaria, 2016

Introduction

Fungi of the Alternaria colonize the superficial layers of the soil and dying vegetation [1, 2]. Most abundant Alternaria spores production are observed at 22 to 28ºC [1, 2]. Alternaria spores are classified as dry spores, since they are released during warm and dry weather [1, 2]. In Poland the threshold value for first clinical symptoms for Alternaria spore for the majority of sensitised patients is visible during exposure to the concentration of 80 spores in 1 m^3 of air [3]. Symptoms were noted in all the subjects sensitized to Alternaria spore at the concentration of approximately 100 spores/m^3 of air [3]. During exposure to the concentration of 150 spores per m^3 the symptoms were acute (at 300 spores/1 m^3 there were wheezing and shortness of breath) [3].

The aim

The aim of the presented research was to compare the concentration of Alternaria spores in 2016 in Cracow, Sosnowiec, Opole, Piotrków Trybunalski, Wrocław, Zielona Góra.

Material and methods

The analysis of the concentration of Alternaria spores was performed on the basis of data collected from the selected cities in 2016. The study was carried out using a volumetric method (Burkard or Lanzoni trap). Spores were counted under a light microscope (× 400) [2, 4]. The spores data were analysed to determine the start and duration of the season using the 90% method [2, 4]. The start of season was defined as the

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Figure 1. *Alternaria spores in the air of Piotrków Trybunalski in 2016.*

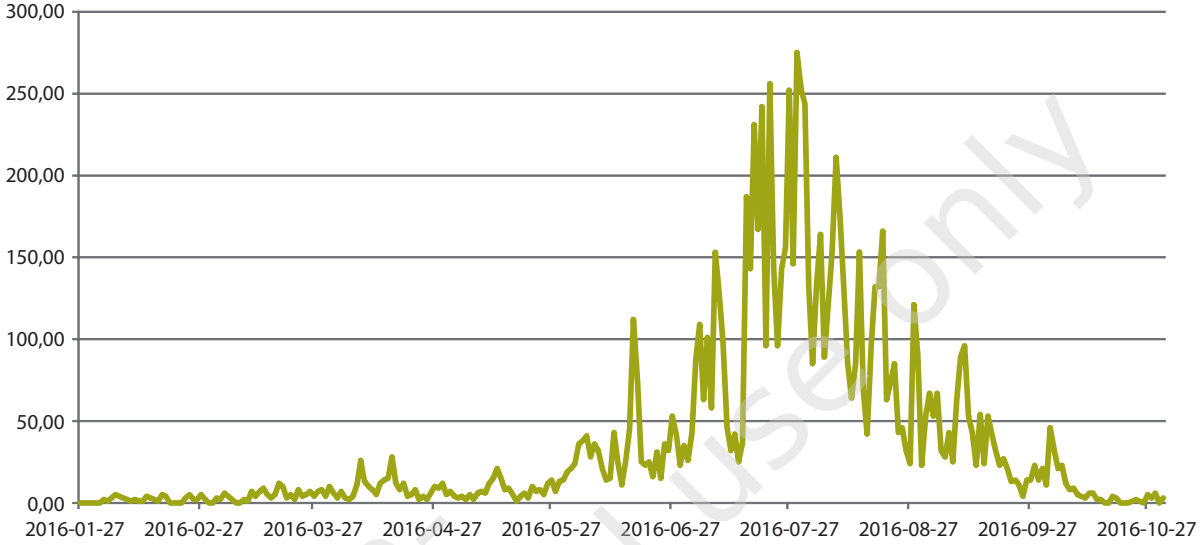

Figure 2. *Alternaria spores in the air of Wrocław in 2016.*

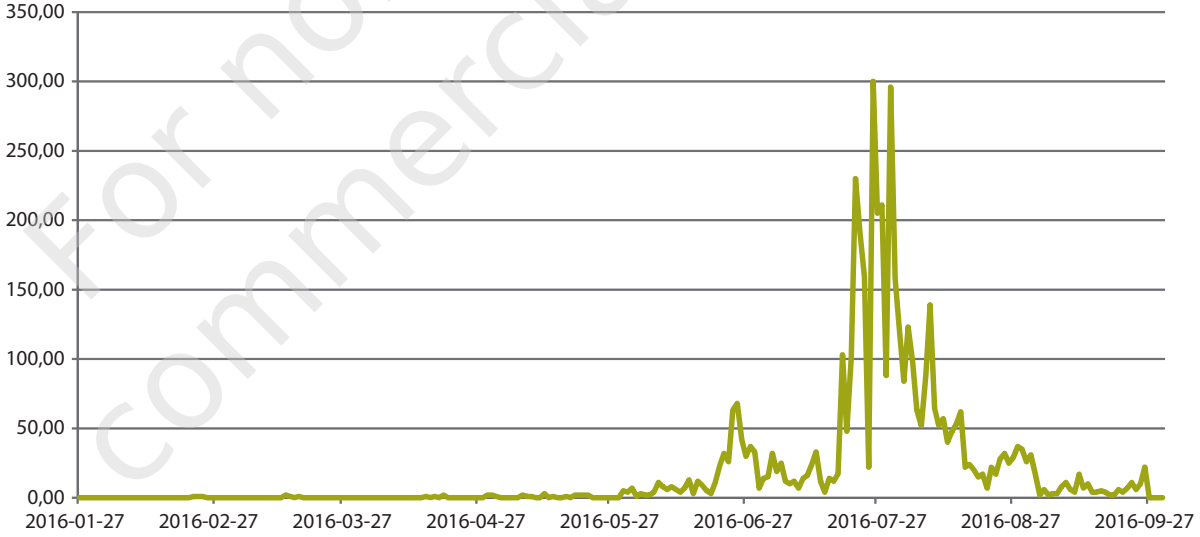

Figure 3. *Alternaria spores in the air of Zielona Góra in 2016.*

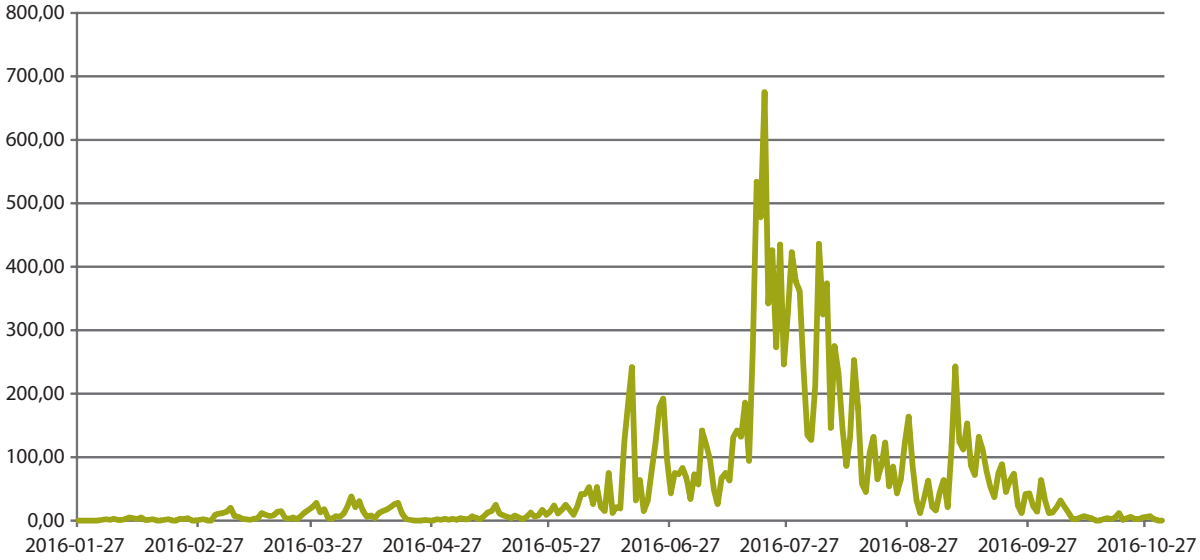

Figure 4. *Alternaria spores in the air of Cracow in 2016.*

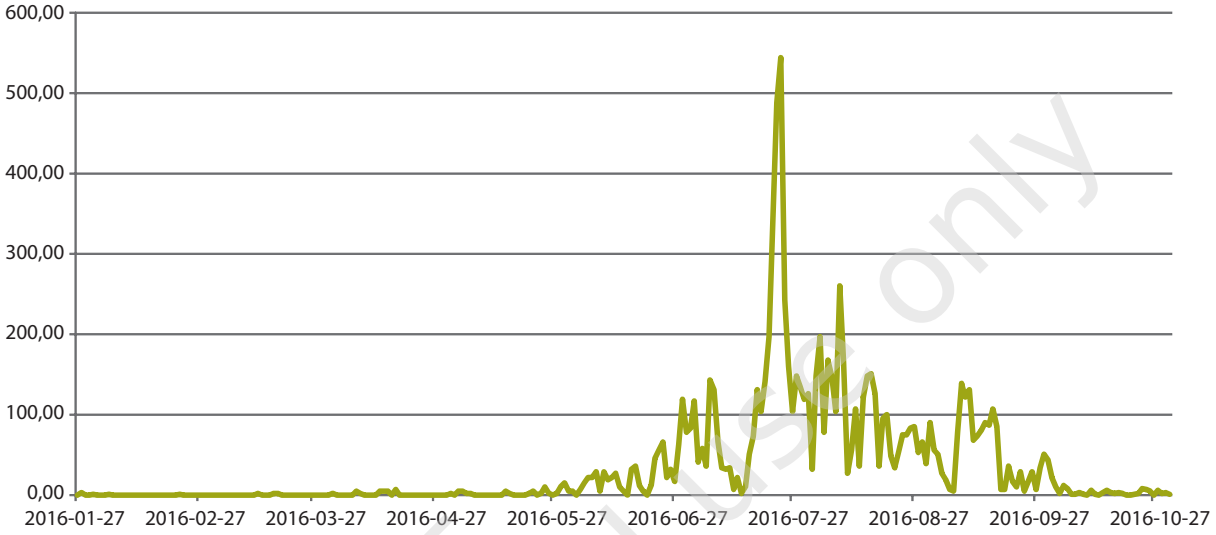

Figure 5. *Alternaria spores in the air of Opole in 2016.*

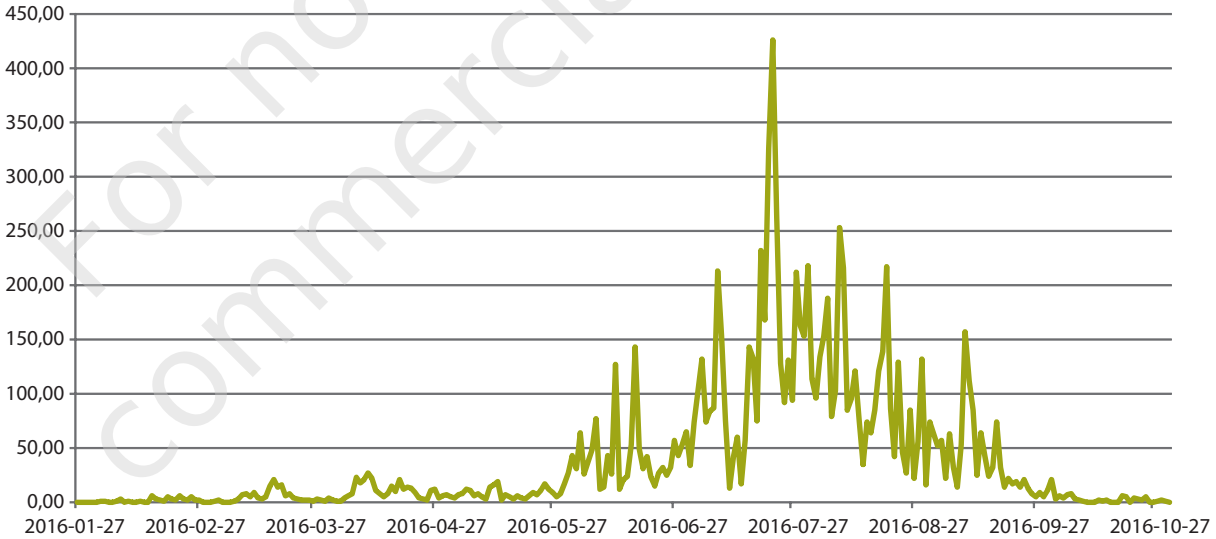

Figure 6. *Alternaria spores in the air of Sosnowiec in 2016.*

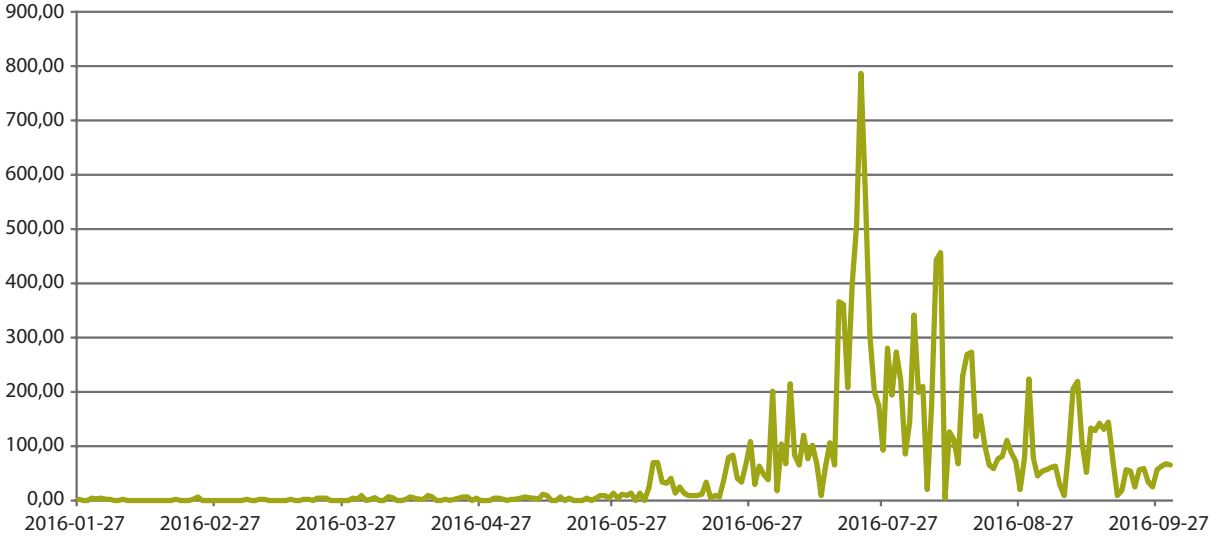

Table 1. *Spore season for Alternaria in selected Polish cities in 2016. The number of days with spores count above 80 spores in 1 m³ – threshold necessary to evoke allergic symptoms. Seasonal Spore Index (SSI) was estimated as the annual sum of daily average spore concentrations (total).*

station	start (date)	peak day (date)	end (date)	peak value	total (SSI)	days	≥ 80 days	≥ 100 days	≥ 150 days	≥ 300 days
Cracow	2016-06-22	2016-07-24	2016-09-17	544,0	9503,0	175	44	35	11	3
Sosnowiec	2016-06-18	2016-07-22	2016-09-16	786,0	14012,0	185	51	44	27	10
Opole	2016-05-05	2016-07-22	2016-09-12	426,0	10668,0	249	45	34	17	2
Piotrków Tryb.	2016-05-08	2016-07-29	2016-09-16	275,0	10182,0	258	45	32	17	0
Wrocław	2016-06-22	2016-07-26	2016-08-30	300,0	4689,0	142	17	13	8	1
Zielona Góra	2016-05-29	2016-07-06	2016-09-16	1231,0	17776,0	256	61	51	31	14

date when 5% of the seasonal cumulative spore count was trapped. Moreover, in the analysis also was determined the number of days with spores count above 80, 100, 150 and 300 in 1 m³ – threshold necessary to evoke allergic symptoms [3].

Results

Appointed by 90% method sporulation season of Alternaria in 2016 began at the earliest in Opole on the 5th May and in Piotrków Trybunalski on the 8th May, and at most measuring points between 29th May (Zielona Góra) and 22nd June (Cracow and Wrocław). Limit concentration of 80 spores per 1 m³ air occurred early in Opole (12nd June) and in a few days intervals at the other measuring points.

In 2016 the maximum daily concentration of Alternaria spores was observed between July 18th and August 9th. The highest daily Alternaria spore count was noted in 2016 in Zielona Góra (1231/m³) and in Sosnowiec (786/m³) (tab. 1). The highest annual sum of Alternaria spore (SSI, Seasonal Spore Index) was observed also in Zielona Góra (17 776) and it was about 3 times higher than in Wrocław (4689). The highest Alternaria spores allergen hazard occurred (above 80 spores/m³) in Zielona Góra (61 days). Spores concentration causing severe clinical symptoms (above 150 spores/m³) was noted also in Zielona Góra (31 days).

Conclusions

Alternaria season in most cities was characterized by very high total annual spores (even to 1231 spores/m³).

The onset of the Alternaria season in 2016 was recorded in Opole and Piotrków Trybunalski in the first decade of May.

The highest Alternaria spores allergen hazard occurred in 2016 in Zielona Góra. The period with spores counts exceeding the threshold value (≥ 80 s/m³) lasted as long as 17 (in Wrocław) – 61 (in Zielona Góra) days.

Accurate pollen and spores announcements are important for efficient prophylaxis and treatment of pollen and spores allergies.

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Rapiejko P.: 50%; Lipiec A.: 15%; and other Authors: 5% each.
Conflict of interests:
The authors declare that they have no competing interests.
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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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