

Short communication

Airborne pollen in Kiev (Ukraine): gravimetric sampling

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Abstract

This article presents the results of aeropalynological observations in Kiev, carried out with a gravimetric method, during January–October, 1994. The six most abundant pollen types were: Betulaceae (21%), Chenopodiaceae/Amaranthaceae (10%), Ambrosia (10%), Artemisia (9%), Pinaceae (8%) and Poaceae (6%). Seasonal fluctuations of the atmospheric presence of tree/shrub and herb/grass pollen during the period March–September, 1993 and 1994, are also shown.

Keywords: Airborne pollen; Kiev; Pollen calendar; Gravimetric sampling

1. Introduction

Surveys of airborne pollen are the base in the process of defining the periods of atmospheric presence of allergenic pollen grains, which may cause allergic diseases (Szozepek, 1994; Eng et al., 1995).

The aeropalynological studies of the atmosphere of Kiev are carried out according to the long-term aerobiological monitoring program in Ukraine. These observations are going on since 1991 in the laboratory of Paleobotany of Kholodny Institute of Botany, National Academy of Sciences of Ukraine. According to the obtained results, the first pollen survey for Kiev (March–September 1993) was worked out (Savitsky et al., 1993).

2. Materials and methods

In 1994, these investigations were continued during 10 months (January–October) using a gravimetric method.

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The trap was placed on the roof top (18 m high) of the M.G. Kholodny Institute of Botany of National Academy of Sciences, Tereshahenkivska, 2. Pollen grains were collected weekly by gravitation on a Petri dish (10 cm in diameter), coated with a thin layer of glycerine. The collected pollen grains were treated using the acetolysis method of Erdtman (Pollen analysis, 1950). The identification and counting of the unstained pollen grains was done under the microscope, scanning the whole area of the cover glass (18 × 18mm).

3. Results

The content of tree and shrub pollen in the air for the period January–October 1994 was 40.4% (Table 1). The pollen from representatives of the family Betulaceae (*Betula* sp., *B. pendula* Roth, *B. pubescens* Erch., *Carpinus* sp., *C. betulus* L.) account to 21.3%, and the Pinaceae are present with 7.9%. All other tree or shrub pollen types were present in the samples with numbers lower than 5%. The total annual sums of 20 pollen types were below 10 (Table 1). Herb and grass pollens

Table 1
Airborne pollen in Kiev, 1994

Pollen types	Months										Total (%)
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Trees/shrubs											
Betulaceae	—	1	19	330	42	6	3	2	3	1	407 (21.3)
Pinaceae	1	1	1	1	121	3	6	5	7	5	151 (7.9)
<i>Salix</i> sp.	—	—	—	18	20	—	—	—	—	—	38 (2.0)
<i>Acer</i>	—	—	—	20	8	—	—	—	—	—	28 (1.5)
<i>Malus</i>	—	—	—	—	19	1	—	—	—	—	20 (1.0)
<i>Ulmus</i>	—	—	13	6	—	—	—	—	—	—	19 (1.0)
<i>Tilia</i>	—	—	—	—	—	11	2	1	2	—	16 (0.8)
<i>Juglans</i>	—	—	—	—	9	—	1	—	5	—	15 (0.8)
<i>Corylus</i>	—	—	2	10	—	1	—	1	—	—	14 (0.7)
Caprifoliaceae	—	—	—	—	10	—	2	—	—	—	12 (0.6)
<i>Quercus</i> sp.	—	—	—	—	10	—	—	—	—	—	10 (0.5)
Other (19)	—	—	—	—	30	6	3	2	1	—	42 (2.2)
Subtotal trees	1	2	22	392	275	28	17	11	18	6	772 (40.3)
Herbs/grasses											
Chenopodiaceae	1	1	—	—	—	—	38	123	24	5	192 (10.0)
Amaranthaceae											
<i>Ambrosia</i>	—	—	—	—	—	—	—	134	46	7	187 (9.8)
<i>Artemisia</i>	—	—	—	—	—	—	77	57	16	15	165 (8.6)
Poaceae	1	2	—	—	25	31	33	18	5	1	116 (6.1)
Polygonaceae	—	—	—	—	26	2	—	4	5	1	38 (2.0)
Asteraceae	1	—	—	—	—	—	8	16	6	1	32 (1.7)
Rosaceae	—	—	—	—	6	1	3	—	4	3	17 (0.9)
Fabaceae	1	—	—	1	9	—	—	—	1	—	12 (0.6)
Cannabaceae	—	—	—	—	—	—	4	8	—	—	12 (0.6)
Lamiaceae	—	—	—	—	1	2	7	1	—	—	11 (0.6)
Other (20)	1	1	—	—	8	13	19	16	5	3	66 (3.5)
Subtotal herbs	5	4	—	1	75	49	189	377	112	36	848 (44.4)
Unidentified	9	14	34	56	15	59	38	14	25	28	292 (15.3)
Total	15	20	56	449	365	136	244	402	155	70	1912 (100.0)
%	0.8	1.0	2.9	23.5	19.1	7.1	12.8	21.0	8.1	3.7	100.0

grains were present with 44.3%. Chenopodiaceae (10.0%), *Ambrosia* (9.8%), *Artemisia* (8.6%) and Poaceae (6.1%) had an important role. All other types of pollen from herbs or weeds were found in numbers below 5%, and again 20 types did amount to less than 10 grains as annual total (Table 1). On the whole, pollen of 67 taxa were identified: 35 taxa

of trees and shrubs, and 32 taxa of herbs including Poaceae.

The seasonal trends of airborne pollen from trees/shrubs and from herbs/grasses, during 1993 and 1994 in Kiev, are presented in Figs. 1 and 2. The similar trend of seasonal presence in the period March–August 1993 and 1994 is obvious.

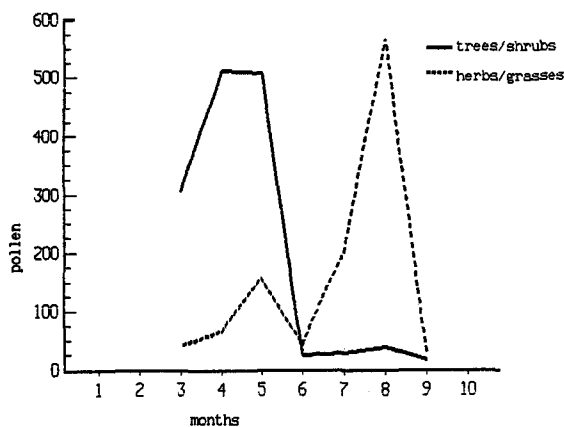


Fig. 1. Weekly airborne pollen during the main pollination period in 1993.

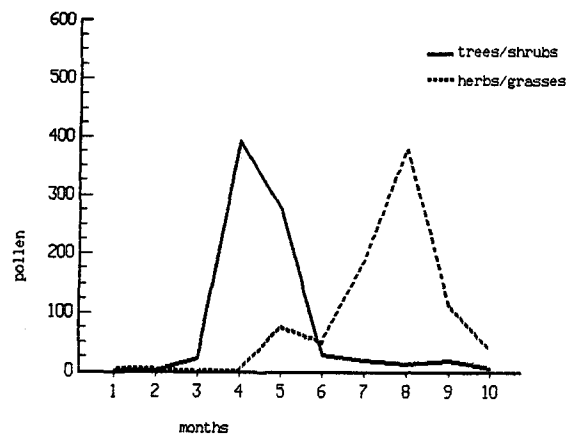


Fig. 2. Weekly airborne pollen during the main pollination period in 1994.

In 1994, the main seasonal periods for the six most abundant pollen types in Kiev's atmosphere are as follows: *Betulaceae*: 29.03–6.04; *Pinus*: 10.06–17.06; *Ambrosia*: 30.08–5.09; *Artemisia*: 20.07–9.08; *Chenopodiaceae/Amaranthaceae*: 16.08–30.08; *Poaceae*: 23.05–20.07.

To be able to work out a pollen calendar for Kiev and surroundings, more years of observation are needed. Therefore, the work will be continued, and the results will be compared with the data of the clinical investigations at Kiev.

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