

Short communication

Airborne pollen in Padua (NE-Italy): A comparison between two pollen samplers

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Abstract

During recent years a gradual decrease in allergenic airborne pollen concentration has been observed in the monitoring station of Padua (Italy). Because technical checks of the sampler were not able to explain this trend, the results obtained from two twin pollen-samplers (Lanzoni VPPS 2000), placed two metres apart, were compared. An eight-week sampling was carried out during the year 2000 from July to September. Subsequent analysis revealed no statistically significant difference between the data obtained with the two instruments. On the other hand, both samplers captured high levels of fungal spores. We conclude that the observed negative trend in pollen count is real and not related to technical biases.

Introduction

To our knowledge, no studies on the variability of data obtained from pollen samplers operating in the same conditions are available in the literature on the subject. The main field of research is the comparison of samplers of different types, the results obtained by instruments located in different places or different methods of slide reading (Arobba et al., 2000; Perez, 2001; Cariñanos, 2002; Carosso, 2000; Sterling, 1999; Comtois and Mandrioli, 1997; Bricchi et al., 2000).

Since 1984 we have performed pollen and fungal spore monitoring in Padua (Veneto – Italy) using a volumetric pollen-trap (VPPS 2000, Lanzoni s.r.l., Bologna, Italy). During the last five years we have observed a gradual but significant decrease of airborne pollen concentration involving all botanical species. Initially, we carried out stricter technical checks of every step in the sampling procedure such as the flow rate, the speed of the advancement of the collection surface (2 mm per hour), the distance between the tape and the intake orifice, which would cause variations

in the air flow, and all the parameters influencing the capture efficiency as defined by Mandrioli (Mandrioli et al., 1998). No biases were found according to the manufacturer's guidelines. Subsequently, we also controlled all the material used: silicon fluid viscosity, glycerine jelly, brushes, tape and its adherence to the drum.

We did not find any technical problems accounting for the low concentration of sampled pollens. Finally, in order to exclude the possibility that there were any technical reasons for the trend in pollen concentrations, we performed a double sampling using a new twin trap placed near the old one.

Materials and methods

Two seven-day volumetric pollen traps (Lanzoni VPPS 2000) located two meters apart on the flat rooftop of Padua Hospital, approximately 20 metres above ground level, were used. No obstacles or sources of heat and pollution influenced the air circulation around the samplers.

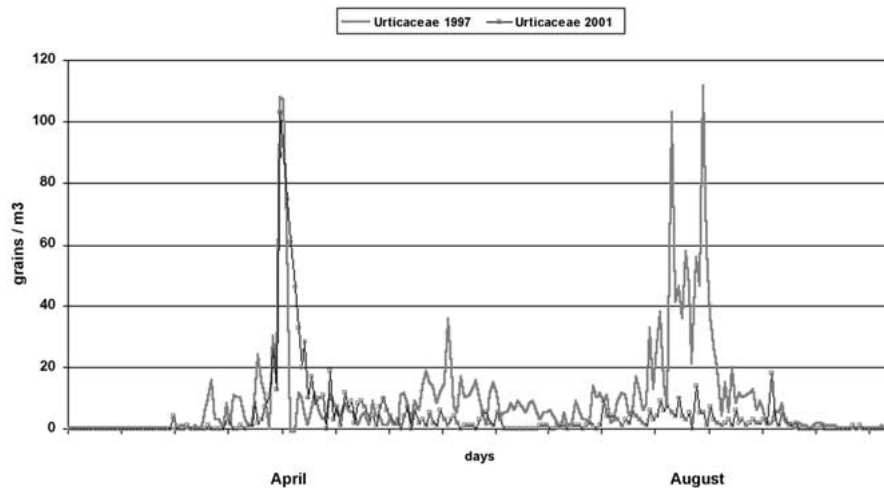


Figure 1. Daily distribution of Urticaceae pollen recorded in Padua during 1997 and 2001.

The sampling period lasted eight weeks, from 2nd August to 24th September 2000. The samples were processed according to AIA recommendations (Mandrioli, 1994) and the slides were always read by the same operator. A statistical analysis was performed using the simple regression test.

Results

Figure 1 shows Urticaceae pollen concentrations over the years 1997 and 2001.

Since differences in pollen concentrations were not observed during the spring, a lack of the summer pollen peak is evident during 2001.

Figure 2 summarises the pollen count of Urticaceae, Compositae and *Alternaria* spores recorded by the two samplers; no statistically significant differences were found. The correlation coefficient ranged from 0.87 to 0.91, demonstrating a low variability between the two samplers.

Discussion and conclusions

The double pollen sampling with twin instruments demonstrated a good reproducibility of obtained data. No significant differences in pollen and fungal spore counts were found. Moreover, higher concentrations of *Alternaria* spores were recorded (Figure 2), as observed during previous years. The *Alternaria* spore and pollen dimensions are similar, providing further evidence of the correct operation of the samplers.

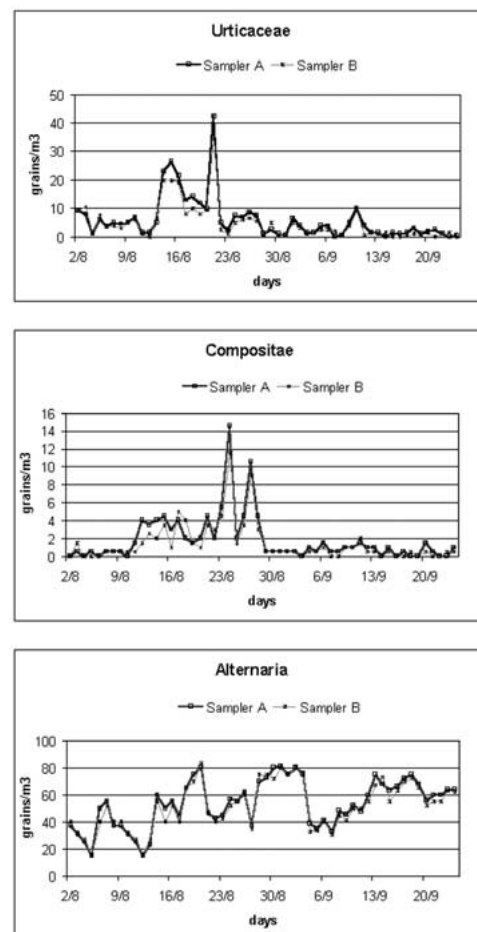


Figure 2. Concentrations of grass pollens and fungal spores measured with two twin samplers in Padua (August–September 2000).

We conclude that the decrease observed in pollen counts during recent years is not related to technical biases but is a real phenomenon. Similarly, other sampling sites located in the same area have recorded analogous pollen count data. Our study demonstrates the good reproducibility of data obtained by instruments of different age. Further studies are needed to explain the progressive decrease in airborne pollens. In particular, meteorological changes may be a factor influencing the observed phenomenon.

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