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Short Communication

Monitoring of *Parthenium* pollen in the atmosphere of Hyderabad and its environs

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Abstract

Air monitored at Safilguda, a semi-urban area in the vicinity of Secunderabad for a period of one year, from May 1988 to April 1989, has shown that the pollen of *Parthenium* account for 81.46% of the total annual pollen catch. While the incidence of the pollen was at the peak from June to September, the highest concentration was recorded in August and the least in February.

It is noted that when the incidence of *Parthenium* pollen was maximum (August), the rest of the pollen types were poorly represented in the aerospora, and conversely, when the pollen of *Parthenium* was poorly represented (February), the rest of the pollen types had peak representation

Key words: Air monitoring, Safilguda, *Parthenium hysterophorus* pollen.

1. Introduction

The significance of the pollen of *Parthenium hysterophorus*. L. as the causative agent in contact dermatitis of exposed skin is now well established[1]. This weedy amphiphilous annual of the family Asteraceae, though not a native of India, has spread extensively in the subcontinent over the last few decades. Wedner *et al*[2] concluded that *P. hysterophorus* pollen has unique allergens whose importance in type I hypersensitivity has been mostly overlooked.

In order to diagnose and predict the allergic diseases by the airborne spores and pollen, it is very essential to know the incidence of the aerospora in the atmosphere of a locality. As it has now become a serious health hazard, the monitoring of the pollen of *Parthenium* in the atmosphere of Hyderabad-Secunderabad region has been undertaken to know its relative incidence in various seasons.

2. Methodology

Air was monitored for a period of one year (1988–1989) using an aeroscope (gravimetric) rotated by wind wane[3]. The aeroscope was installed on the roof of a house at Safilguda at about 30 feet above the ground level. The slides smeared with glycerine:jelly were exposed to the atmosphere every 24 hours and were later mounted in safranin-stained glycerine jelly. The slides thus prepared were critically scanned and the results quantified and analysed.

Safilguda is a semi-urban area, located towards the North-East of Secunderabad. The area is covered by extensive open waste land which is highly congenial for the growth of weeds in general and *Parthenium hysterophorus* in particular. *P. hysterophorus* is the most abundantly encountered weed in this area.

3. Observations

The pollen of this taxon was recorded throughout the year from May 1988 to April 1989. It accounted for as high as 81.46% of the total ambient pollen.

The period from June to September constitutes the peak in the incidence of the pollen (Fig. 1). The highest monthly incidence of the pollen was during August, *i.e.*, 48,135/10 cm^2. There was a steep decline in the frequency of the pollen in October, with a slight increase in December. The period from January to March witnessed a low concentration of pollen in the aerospora, with the least catch (112/10 cm^2) being recorded in February (Table I).

The following are the essential features of the pollen morphology of *Parthenium hysterophorous*: Pollen grains are radially symmetrical, isopolar, $\pm$ spheroidal, 21.8 μm in diameter, Zonaperturate, tricolporate, colpi long and tapering, ora lolongate to circular, exine 4.6 μm thick, sexine thicker than nexine, tectate, sculpture supratectal, echinate, spines 2.3 μm long.

It was observed that as the concentration of *Parthenium* gradually increased and reached its peak in August, the pollen of other taxa (represented by *Grass, Ricinus, Tridax, Cyperus, Prosopis, Croton, Holoptelea, Casuarina, Azadirachta*, etc.) showed a steady decline in the concentration. After August, pollen of the other taxa showed a gradual increase in

Table I
Incidence of *Parthenium* in the aerospora (1988–1989)

Months	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Total no. of pollen/10 cm^2	708	1886	14604	50935	18795	6166	2657	1712	1621	1285	1477	1211
No. of *Parthenium* pollen/10 cm^2	363	1597	13372	48135	15890	2632	690	514	181	112	152	311
% Contribution of *Parthenium* pollen	51.27	84.67	91.56	94.50	84.54	42.69	25.96	30.02	11.17	8.72	10.29	25.68

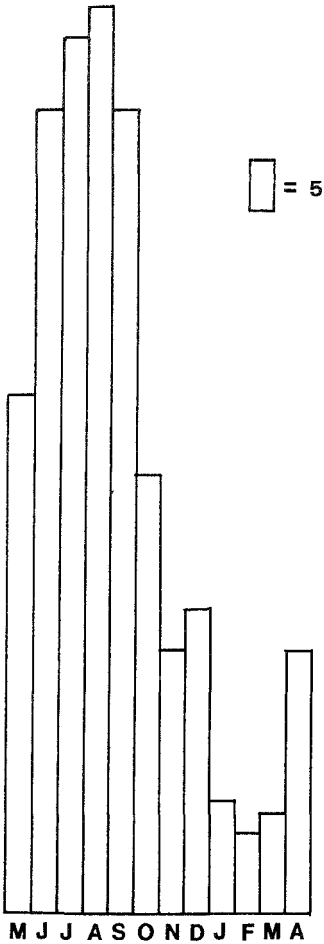

FIG. 1. Airborne pollen of *Parthenium* (% on total pollen count per month).

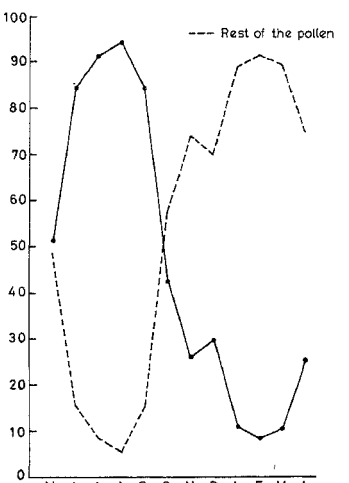

FIG. 2. Pollen of *Parthenium vs* rest of the pollen types.

concentration with a peak representation in February, while the pollen of *Parthenium* was poorly represented (Fig. 2).

A floristic survey of the locality showed the overwhelming numerical preponderance of *Parthenium* in the ground flora. It was also found growing abundantly along the borders of the paddy fields. The flowering period of this genus extends almost throughout the year. Despite being considered amphiphilous, wind seems to be the major means of pollen dispersal in *Parthenium*, which incidentally produces abundant pollen (1.7 million) per plant[4].

4. Discussion

Air-monitoring of the pollen of *Parthenium* has brought to light the following aspects.

Over 80% of the annual pollen in the Safilguda area was represented by the pollen of *Parthenium* which incidentally is a high figure for a taxon with known allergenic properties. This high incidence of the pollen in the aerospora is in conformity with the numerical preponderance of this plant in the area under study. It may be noted that *Parthenium* pollen is found throughout the year in the atmosphere of the area under study. The tendency of *Parthenium* pollen to be airborne in appreciable quantities particularly in the vicinity of their source plants is proved in this study and this may contribute to wide-spread pollinosis in the area.

The findings of the study are strikingly similar to those obtained from Bangalore[5], where the pollen accounted for as high as 66.18% of the total pollen catch, with the highest number during August (765/cm^3).

Seetharamaiah *et al*[6] found *Parthenium* pollen throughout the year either as single grains or in clumps at Bangalore, with a maximum frequency from June to August (24–40%). Significant amount of airborne pollen of *Parthenium* has also been recorded at Aurangabad[7], Kolhapur[8], and Gulbarga[9].

The data obtained from aerobiological studies conducted at Saifabad, an urban locality in Hyderabad[10], during 1980 and 1981, showed that the *Parthenium* pollen contribute only to 2.77% (1980) and 4.5% (1981) of the ambient pollen in the aerospora.

In both the areas (*viz.*, urban and semi-urban), the peak period for *Parthenium* pollen is June to September, with the maximum catch during July at Saifabad and August at Safilguda. This pollen was either not recorded or very meagerly found at Saifabad during February 1980 and 1981, which is somewhat comparable to its poor representation in February during 1988–1989 at Safilguda. The monsoon period for Hyderabad and its environs is from June to September which is also the peak period in the incidence of the pollen.

The present study thus is of some significance as it provides information regarding the peak period of incidence of this pollen in the atmosphere which can be correlated with the large-scale appearance of allergy disorders caused by the pollen of this genus in the vicinity of Secunderabad.

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