ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

ATMOSPHERIC POLLEN GRAINS SCENARIO IN AMBAJOGAI AND NEARBY VILLAGE AREA FROM 2016-2023

*** Dr. A. D. Dhimdhime**

** Department of Environmental Studies. Ghanshyamdas Saraf College of Arts & Commerce, Malad (W), Mumbai-400064*

Abstract:

Continuous pollen monitoring was undertaken from 2016-2023 near Ambajogai city by using individual pollen collector (Leuschner and Boehm 1977). Although more than 50 different pollen types were recorded, emphasis has been given to the most prevalent and most important pollen types from the point of view of allergy. The invasion of Ambajogai city and nearby village area by weeds and cultivated plants is reflected in the atmospheric pollen.

This paper documents the details of the total count of pollen grains, the pollen counts of allergenically significant taxa.

Introduction:

Since the extensive aerobiological work was carried out and continuous monitoring of the airspora undertaken in different parts of Ambajogai and nearby area to get the qualitative and quantitative data on day today variation in the concentration of different pollen types. This data enabled compilation of the pollen calendar, which depicts the duration and quantity of various pollen types in the atmosphere. From the earlier work, it is quite clear that the magnitude and quality of the annual pollen load in the atmosphere vary significantly. Therefore, aerobiological survey of an area is conducted continuously over the years and pollen calendars compiled and updated at regular intervals.

Climate and Average Weather Year-Round in Ambājogāi:

In Ambājogāi, the wet season is muggy/ sticky/sultry unpleasantly warm and the air contains a lot of water and overcast, the dry season is mostly clear, and it is hot year-round. Over the course of the year, the temperature typically varies from *14°C* to *38°C* and is rarely below *11°C* or above *41°C*.

Topography:

For the purposes of this report, the geographical coordinates of Ambājogāi are 18.733 deg latitude, 76.386 deg longitude, and 2,077 ft elevation.

The topography within *2 miles* of Ambājogāi contains only *modest* variations in elevation, with a maximum elevation change of *417 feet* and an average elevation above sea level of *2,080 feet*. Within *10 miles* contains only *modest* variations in elevation (*883 feet*). Within *50 miles* also contains *very significant* variations in elevation (*1,516 feet*).

The area within *2 miles* of Ambājogāi is covered by *cropland* (*56%*), *artificial surfaces* (*15%*), and *grassland* (*13%*), within *10 miles* by *cropland* (*72%*) and *grassland* (*11%*), and within *50 miles* by *cropland* (*72%*) and *grassland* (*10%*).

Precipitation:

A *wet day* is one with at least *0.04 inches* of liquid or

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

liquid-equivalent precipitation. The chance of wet days in Ambājogāi varies significantly throughout the year.

The *wetter season* lasts *4.5 months*, from *May 29* to *October 12*, with a greater than *24%* chance of a given day being a wet day. The month with the most wet days in Ambājogāi is *July*, with an average of *13.8 days* with at least *0.04 inches* of precipitation.

The *drier season* lasts *7.5 months*, from *October 12* to *May 29*. The month with the fewest wet days in Ambājogāi is *February*, with an average of *0.6 days* with at least *0.04 inches* of precipitation.

Among wet days, we distinguish between those that experience *rain alone*, *snow alone*, or a *mixture* of the two. The month with the most days of *rain alone* in Ambājogāi is *July*, with an average of *13.8 days*. Based on this categorization, the most common form of precipitation throughout the year is *rain alone*, with a peak probability of *46%* on *July 16*.

Average temperature:

The *hot season* lasts for *2.0 months*, from *March 28* to *May 30*, with an average daily high temperature above *36°C*. The hottest month of the year in Ambājogāi is *May*, with an average high of *37°C* and low of *26°C*.

The *cool season* lasts for *3.5 months*, from *October 14* to *January 30*, with an average daily high temperature below *30°C*. The coldest month of the year in Ambājogāi is *December*, with an average low of *15°C* and high of *27°C*.

Rainfall:

Ambājogāi experiences *extreme* seasonal variation in monthly rainfall.

The *rainy* period of the year lasts for *6.7 months*, from *April 28* to *November 19*, with a sliding 31-day rainfall of at least *0.5 inches*. The month with the most rain in Ambājogāi is *September*, with an average rainfall of *5.8 inches*.

The *rainless* period of the year lasts for *5.3 months*, from *November 19* to *April 28*. The month with the least rain in Ambājogāi is *February*, with an average rainfall of *0.1 inches*.

Humidity:

The humidity comfort level on the dew point, as it determines whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid. Unlike temperature, which typically varies significantly between night and day, dew point tends to change more slowly, so while the temperature may drop at night, a muggy day is typically followed by a muggy night.

Ambājogāi experiences *extreme* seasonal variation in the perceived humidity.

The *muggier period* of the year lasts for *5.7 months*, from *May 14* to *November 3*, during which time the comfort level is *muggy*, *oppressive*, or *miserable* at least *25%* of the time. The month with the muggiest *days* in Ambājogāi is *July*, with *29.9 days* that are *muggy* or worse.

The month with the fewest *muggy days* in Ambājogāi is *February*, with *0.6 days* that are *muggy* or worse.

Sunny days/ Solar Energy:

Solar energy reaching the surface of the ground over a wide area, taking full account of seasonal variations in the length of the day, the elevation of the Sun above the horizon, and absorption by clouds and other atmospheric constituents. Shortwave radiation includes visible light and ultraviolet radiation.

The average daily incident shortwave solar energy experiences *some* seasonal variation over the course of the year.

The *brighter* period of the year lasts for *2.5 months*, from *March 7* to *May 23*, with an average daily incident shortwave energy per square meter above *6.7 kWh*. The *brightest* month of the year in Ambājogāi is *April*, with an average of *7.1 kWh*.

The *darker* period of the year lasts for *3.0 months*, from *June 20* to *September 21*, with an average daily

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

incident shortwave energy per square meter below *5.3 kWh*. The *darkest* month of the year in Ambājogāi is *July*, with an average of *4.9 kWh*

Materials and Methods:

Pollen monitoring was carried out by using individual pollen collector (Leuschner and Boehm 1977) which was tagged with the cloths of individual who covered different parts of the city and nearby area during periods of inhabitation.

Individual pollen collector was developed by Boehm. The device is based on the principle of sedimentation and is helpful to analysis the type of pollen that patient may inhale during his movement and is instructive for the allergologists to determine the possibility of exposure of patients to the type of allergens. The results were estimated to number of airborne particles/cm².

Results and Discussion:

A total of more than 50 different pollen types were recorded in the Ambajogai and nearby area atmosphere from 2016-2023, but emphasis was given to the most prevalent and most notorious pollen types from the point of view of allergy. The tremendous invasion of Ambajogai city and nearby area by weeds and cultivated plants is reflected in the atmosphere pollen grains. From among them the prominent were Parthenium sp., Prosopis sp., grass pollen, Amaranthus sp., Dodonia sp. The incidence of their allergenically important pollen grain types from 2016-2023 has been given in Table 1. Their relative percentage is given in Fig-1.

It is clear from work done earlier that the magnitude as well as quality of the annual pollen load in the atmosphere varied significantly. The critical analysis of the atmospheric pollen during the last seven years indicated more or less a gradual decrease in the pollen count of Parthenium, sp (53.37% to 22.45%) and increase in the pollen count of Amaranthus, sp (1.90% to 4.28%), Prosopis sp (11.37% to 30.44%), grass pollen (6.5% to 9.69%) and Dodonia sp. (1.29% to 2.11%).

The reason for the gradual decrease in the counts of Parthenium could be due to the introduction of eradication program of Parthenium vegetation and urbanization.

Identical results were obtained from earlier investigation Mandal and Chauda (1981), from various places of West Bengal. Sinha and Mishra (1988) quantitatively analysed the pollen grains of the atmosphere of Bodh-Gaya. Tilak and Vishwe (1980 a,b), surveyed the aeroallergens of Aurangabad and reported airborne allergenically significant pollen types, were Parthenium contributed highest frequency followed by grass pollen. Agashe et. al. (1999), recorded over hundred different types of pollen grains in Bangalore city atmosphere and gave emphasis to the most prevalent and most important pollen types from the point of view of allergy. Jain et. al. (1979 and 1992) from Gwalior reported 41allergic pollen types from Bhopal. Tilak (1984), reviewed the work on airborne entomophilous allergenic pollen grains.

Thus, it is evident from the above account that the magnitude and the quality of annual pollen load in the atmosphere can vary significantly. As such it is necessary that the aerobiological survey of an area, be a continuous process over the years. It is imperative for an allergist to update the pollen calendar every year and to keep track of the variation in airspora. Updating the pollen calendar every year also gives a clear picture of the duration of occurrence of pollen in the atmosphere. The prolongation of occurrence of allergenically significant pollen in the atmosphere influences the prolongation of allergy symptom in-patients. This will help in a better correlation of allergy symptoms of patients with atmosphere pollen which will be useful in proper diagnosis and treatment.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

Table 1: Showing incidence of allergenically important pollen grains in Ambajogai and nearby village area from 2016 – 2023 in atmosphere.

Pollen Types	Year			
	2016-2017	2018-2019	2020-2021	2022-2023
Parthenium species	53.37	44.02	39.7	22.45
Prosopis species	11.37	8.04	2.5	30.44
Grass pollens	6.5	6.02	5.5	9.69
Amaranthus species	1.9	2.99	5.7	4.28
Dodonia species	1.29	3.14	10.00	2.11

Fig 1: Showing incidence of allergenically important pollen grains in Ambajogai and nearby village area from 2016 – 2023 atmosphere.

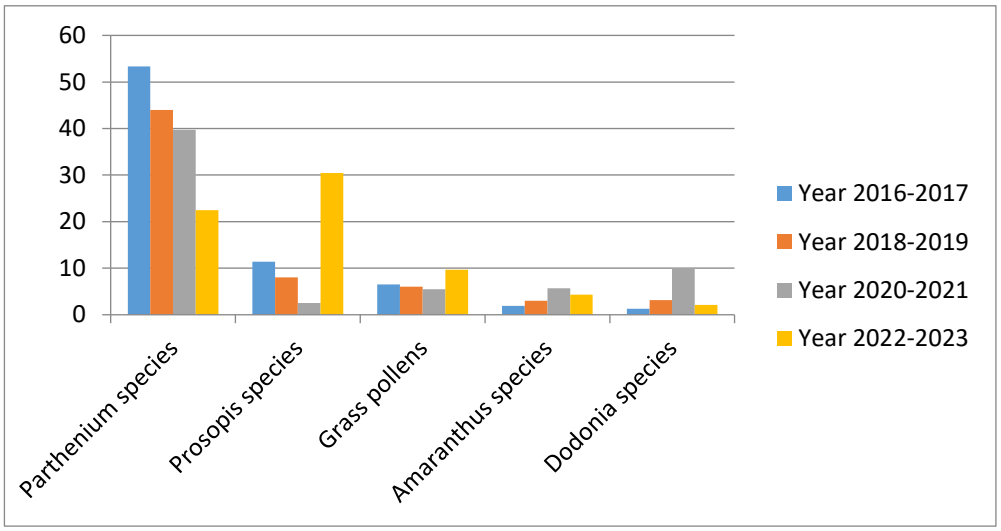
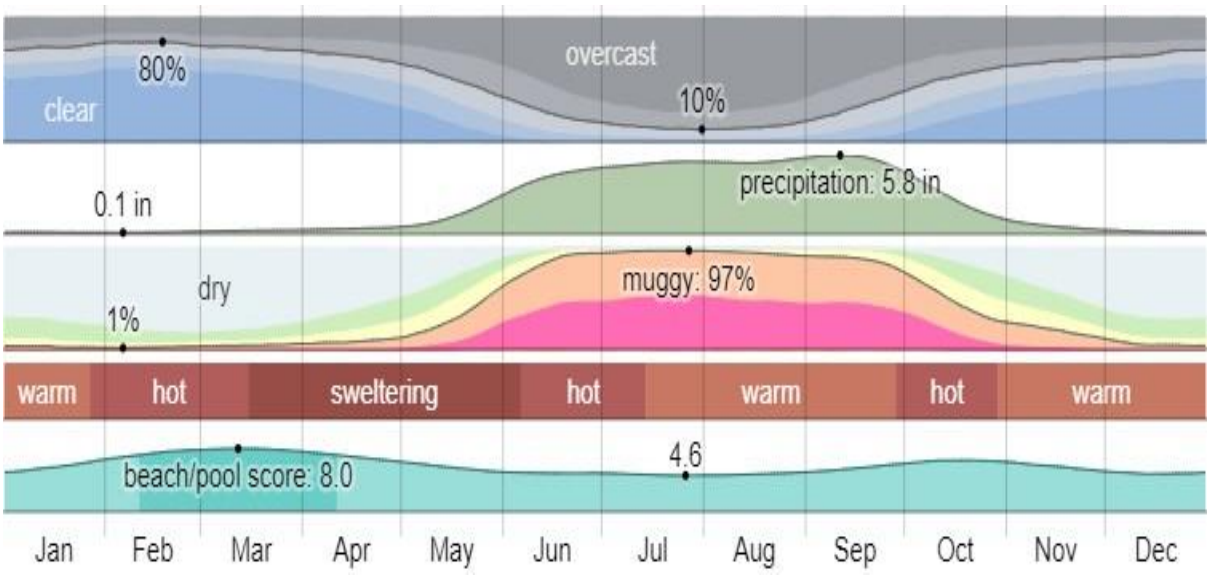


Fig.2. Overall climatic condition in Ambajogai.



ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

Fig.3. Overall Humidity condition in Ambajogai.

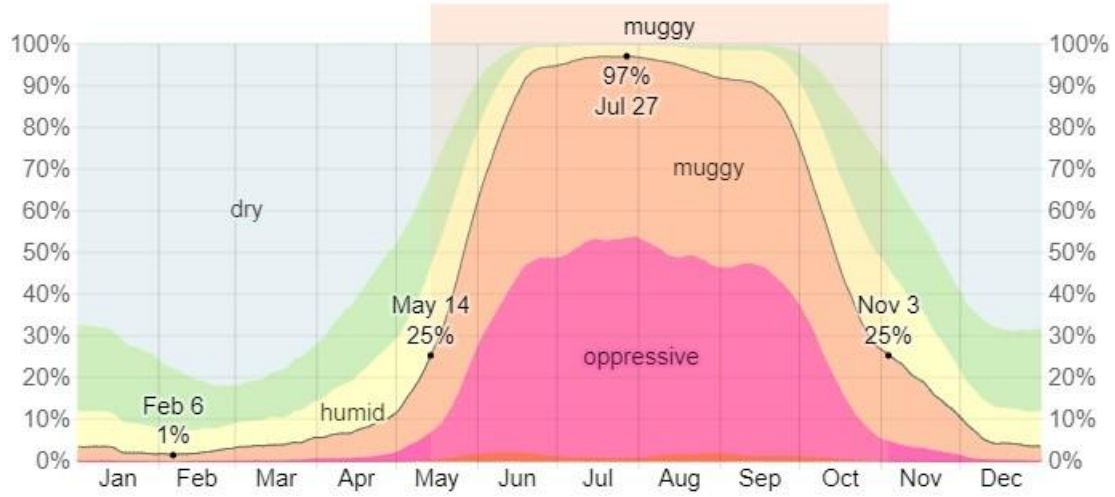


Fig.4. Overall precipitation/rainfall condition in Ambajogai.

References:

Agashe, S. N., H. G. Anuradaha and J. D. M. Scinthia (1999). Atmospheric pollen scenario in Bangalore during the past 15 years (1982 to 1997) Ind. J. Aerobiol. Vol. 12. No. 1 and 2: 30-32.

Jain, A. K., P. Patel and T. R. Datta (1992). Production, dispersion and sensitivity of some allergenic pollen grains at Gwalior. Ind. J. Aerobiol. Sp. 1: 95-98.

Jain, S. N., P.Manikyachary, K. G. R. Murthy and P. Prakasamma (1979). Incidence of bronchial asthma in patients with nasal allergy. Appergy. Appl: Immunol. 12:129-134.

Leuschner, R. M. and Boehm, G. (1977). Individual pollen collector for use of Hay fever patients in comparison with the Burkard Trap: Grana 16: 183-186.

Mandal, S. and S. Chanda (1981). Aeroallergens of West Bengal in the context of environmental

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIII, Issues– I / B Jan – Feb, 2024

OPEN ACCESS Original Research Article

pollution and respiratory allergy. Biol. Mem., 6(1): 1-61.

Sinha, S. S., and K. B. Mishra (1988). Quantitative analysis of airborne pollen of rural area around Gaya, IJA. Vol. 1, (No. 1): 45-521.

Tilak, S. T. (1984). Airborne entomophilous pollen grain. J. Pl. and Nat. 1: 45-50.

Tilak, S. T., and D. B. Wishwe (1980 a). Aeroallergenic pollen at Aurangabad, Maharashtra Medical Journal 26: 291-294.

Tilak, S. T., and D. B. Wishwe (1980 b). Aeroallergenic pollen at Aurangabad. Adv. Pollen. Spore. Res. V-VIII: 145-149.

Cite This Article:

Dr. Dhimdhime A.D. (2024). *Atmospheric Pollen Grains Scenario in Ambajogai and Nearby Village Area from 2016-2023. In Aarhat Multidisciplinary International Education Research Journal: Vol. XIII (Number I, pp.95–100).* ***AMIERJ.*** *https://doi.org/10.5281/zenodo.10576771*