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A STUDY OF ATMOSPHERIC POLLEN IN OSMANABAD

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ABSTRACT:

The present research paper deals with the study of atmospheric pollen at Osmanabad (MS). The investigation was carried out from 1st January 2017 to 31st December 2017. The systematic atmospheric study was conducted by using volumetric Tikal air sampler. In the present investigation total 26 pollen types were found. Grass pollen was dominant in all season. Pollen calendar shows seasonal variation and flowering period of local vegetation [Osmanabad].



KEYWORDS: atmospheric pollen , Grass pollen , systematic atmospheric.

INTRODUCTION:

Air pollution occurs when excessive quantities of substances including pollen grains, fungal spores, bacteria, algal cells and other particles are introduced into the air. Pollen grains are produced by flowering plants. The size, shape, colour and ornamentation of pollen grains are variable according to species to species. Pollen grains are most common triggers for seasonal allergy. To determine the allergic properties many aeropalynological survey and investigations were carried out by many aerobiologists such as Kasliwal [1958], Chanda and Sarkar [1972], Tilak and Vishwe [1979], Shivpuri [1964], Roopashree [2015] etc.

MATERIAL AND METHOD:

In the present investigation was carried out with the help of volumetric Tilak air sampler (Tilak and Kulkarni, 1970).

SAMPLING METHODS :

Sampling was carried out by operating continuously the Tilak air sampler, with its orifice kept at constant height of 1.5-2 meters above ground level. Air was sampled at the rate of 5 liters/ min. and the transparent cello tape coated with adhesive petroleum jelly was changed every eight days at about 5.00 p.m. The exposed tape was cut into eight equal parts each representing 24 hrs. trace area. These 8 parts of tape were again cut into two parts, each representing 12 hrs. trace area of day and night accordingly. The tape pieces were mounted on

slides, using glycerine jelly as a mountant.

SCANNING :

Scanning was done regularly. Scanned under 10 x 45 eye pieces objectives combination of the microscope. The identification of the trapped pollen types was based on a) Morphological characters b) Visual identification by comparison with reference slides.

STUDY SITE:

Pollen studies were carried out at Osmanabad a district of Maharashtra State, India. Osmanabad is located at 76°4'25"E longitude and 18°19'10"N latitude and situated at 652 meters above sea level.

CLIMATIC CONDITION:

An analysis of weather data of

Osmanabad reveals three weather seasons over a year. They are-A) Monsoon season (15th June to 15th October) B) Winter season (15th October to 15th February) C) Summer season (15th February to 15th June). Graphical presentation show climatic conditions.

RESULTS:

Pollen grains availability in the atmosphere was correlated with local flowering season and vegetation around the study site. Total 26 type's pollen were found during the investigation. These are *Acalyphahispida*, *Amaranthusvirides*, *Argemonmexicana*, *Azadiractaindica*, *Bougainvillea spectabilis*, *Caesalpinia pulcherrima*, *Casuarina equisetifolia*, *Cassia fistul*, *Cocos nucifera*, *Cyperus rotundus*, *Datura metal*, *Eucalyptus globulus*, *Euphorbia sp*, *Grass*, *Helianthus annus*, *Hibiscus rosa-sinensis*, *Lantana camera*, *Leucaenaleucocephala*, *Mangifera indica*, *Moringaoleifera indica*, *Parthenium hysterophorus*, *Poaceae*, *Ricinus communis*, *Sorghum sp*, *Syzygium cuminis* and Unidentified pollen. Unidentified pollen includes those pollen grains whose identification is not clear due to the following reason mix with other particles, semitransparent, rupture wall, etc.

Grass pollen contributed highest percentage of contribution (36.90%) to the total palynospora. The size of grass pollens were less than 50 μm . Second highest contributor was *Cyprus rotundus* contributed (13.26%) to the total air palynospora. Third contributor was *Moringaoleifers* contributed (9.24%) to the total air palynospora. Other pollen types contributed to the total air palynospora were shown in the table A.

Pollen grains are two types Anemophilous and Entomophilous, Anemophilous pollen were abundant in the air as compare to entomophilous pollens. Pollen availability is correlated with meteorological factors such as wind speed, rainfall etc. and flowering season.

Pollen calendar is prepared. It gives an idea of flowering season and forthcoming pollen load. [Table B]

Table A: Monthly frequency of various aerial Pollen of Osmanabad atmosphere trapped in Volumetric Tilak Air Sampler from 1 January 2017 to 31st December 2017.

Sr. No	Pollen grains	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total	Volumetric Total pollen Concentration Per m ³	Percentage Contribution to the Total Air Palynospora
1	<i>Acalyphahispida</i>	4	4	2	2	2	-	-	1	2	2	2	2	23	322	1.53
2	<i>Amaranthusvirides</i>	4	3	2	1	1	2	2	12	11	5	5	4	52	728	3.46
3	<i>Argemon Mexicana</i>	2	2	1	2	1	-	-	-	-	-	-	-	8	112	0.53
4	<i>Azadiractaindica</i>	5	7	4	5	-	-	-	-	-	-	-	-	21	294	1.40
5	<i>Bougainvillea spectabilis</i>	4	4	2	2	4	5	-	-	-	-	-	-	21	294	1.40

6	Caesalpiniapulcherrima	4	4	-	-	-	2	2	1	1	2	2	4	22	308	1.46
7	Casuarina equisetifolia	4	2	4	4	6	-	-	-	4	4	-	-	28	392	1.86
8	Cassia fistula	-	-	3	3	2	2	-	-	2	2	-	-	14	196	0.93
9	Cocos nucifera	1	1	1	-	-	-	2	2	4	2	2	1	16	224	1.06
10	Cyperusrotundus	12	8	3	2	2	8	8	34	37	38	24	22	198	2772	13.16
11	Datura metal	2	2	2	-	-	-	2	2	3	3	4	2	22	308	1.46
12	Eucalyptus globulus	2	2	-	-	-	-	-	-	-	1	2	2	9	126	0.60
13	Euphorbia sp	2	2	2	1	1	-	-	2	4	4	2	4	24	336	1.60
14	Grass	55	40	24	12	10	10	20	70	112	102	60	40	555	7770	36.90

Sr. No.	Pollen grains	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Volumetric Total Spore Concentration Per m3	Percentage Contribution to the Total Air Palynospora
15	Helianthus annus	-	-	-	-	-	-	-	-	1	2	2	-	5	70	0.33
16	Hibiscus rosa-sinensis	-	-	-	-	-	-	-	2	4	2	-	-	8	112	0.53
17	Lantana camera	2	-	-	-	-	-	-	-	4	2	-	2	10	140	0.66
18	Leucaenaleucocephala	-	-	-	-	-	-	-	2	2	2	4	4	14	196	0.93
19	Mangiferaindica	-	4	2	2	-	-	-	-	-	-	-	-	8	112	0.53
20	Moringaoleifera	12	14	17	23	19	7	5	8	9	11	7	7	139	1946	9.24
21	Partheniumhysterophorus	4	2	4	2	1	1	2	20	22	16	16	8	98	1372	6.52
22	Poaceae	9	7	4	2	1	1	4	13	20	15	10	7	93	1302	6.18
23	Ricinuscommunis	4	4	4	3	3	3	4	6	9	10	8	6	64	896	4.25
24	Sorghum sp	2	-	-	-	-	-	-	4	4	-	-	4	14	196	0.93
25	Syzygiumcuminis	-	1	2	2	2	-	-	-	-	-	-	-	7	98	0.47
26	Unidentified pollen	2	3	2	2	2	2	2	3	4	3	3	3	31	434	2.06
	Total Pollen grains	136	116	85	70	57	43	53	182	259	228	153	122	1504	21056	99.99

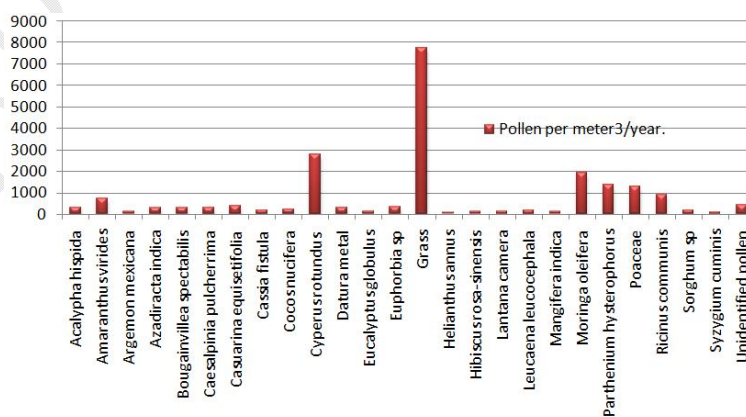
Table B: Pollen Calendar of Osmanabad city

Sr. No	Name of the Plant	Habit	Pollination Type	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1	<i>Acalyphahispida</i>	S	AE	●	●	●	●	-	-	-	●	●	●	●	●
2	<i>Amaranthusvirides</i>	H	EA	-	-	-	-	-	-	-	●	●	●	●	●
3	<i>Argemonemexicana</i>	H	E	*	*	*	*	*	*	*	*	*	*	*	*
4	<i>Azadiractaindica</i>	T	EA	-	●	●	●	●	-	-	-	-	-	-	-
5	<i>Bougainvillea spectabilis</i>	S	E	*	●	●	●	●	●	*	*	*	*	*	*
6	<i>Caesalpinia pulcherrima</i>	S	E	*	*	●	●	*	*	*	*	●	●	●	*
7	<i>Cajanascajan</i>	S	E	●	●	-	-	-	-	-	-	●	●	●	●
8	<i>Cassia fistula</i>	T	E	-	-	●	●	●	●	●	-	-	-	-	-
9	<i>Cocos nucifera</i>	T	A	*	*	*	*	*	*	*	*	*	*	*	*
10	<i>Cyperus rotundus</i>	H	A	*	*	*	*	*	●	●	●	●	●	●	*
11	<i>Datura metal</i>	S	E	●	●	●	-	-	-	●	●	●	●	●	●
12	<i>Eucalyptus globulus</i>	T	EA	*	*	*	-	-	-	-	-	-	-	*	●
13	<i>Euphorbia hirta</i>	H	E	*	*	*	*	*	*	*	*	*	*	*	*
14	<i>Feronia elephantum</i>	T	E	-	-	●	●	●	●	●	●	●	-	-	-
15	<i>Helianthus annus</i>	H	E	-	-	-	-	-	-	-	-	●	●	●	●
16	<i>Hibiscus rosa-sinensis</i>	S	E	*	*	*	*	*	*	*	●	●	●	*	*
17	<i>Lantana camera</i>	S	E	*	*	*	*	*	*	*	*	●	●	*	*
18	<i>Leucaena leucocephala</i>	T	E	●	-	-	-	-	-	-	●	●	●	●	●

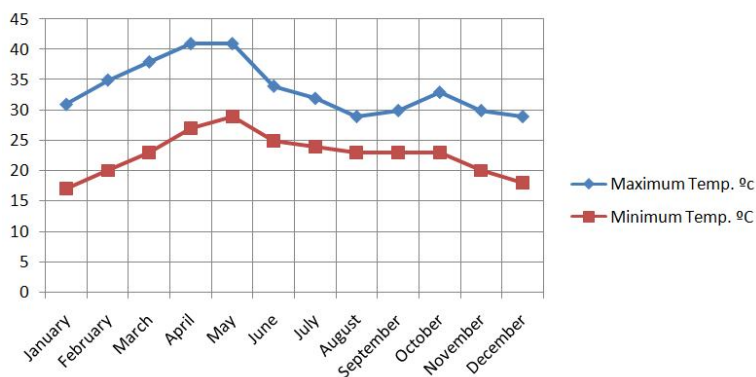
Sr. No	Name of the Plant	Habit	Pollination Type	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
19	<i>Mangifera indica</i>	T	E	●	●	●	●	-	-	-	-	-	-	-	-
20	<i>Moringa oleifera</i>	T	EA	*	*	●	●	*	*	*	*	*	*	*	*
21	<i>Parthenium hysterophorus</i>	H	EA	●	●	●	●	●	●	●	●	●	●	●	●
22	<i>Ricinus communis</i>	S	A	*	*	*	*	*	*	*	●	●	●	*	*
23	<i>Syzygium cumini</i>	T	E	-	-	●	●	●	●	●	-	-	-	-	-
24	<i>Tamarandus indica</i>	T	E	*	*	*	*	*	*	*	*	*	*	*	*
25	<i>Tectonagrandis</i>	T	E	-	-	-	-	-	-	●	●	●	●	●	●
26	<i>Zizipus jujuba</i>	T	E	●	-	-	-	-	-	-	-	●	●	●	●

Name of PlantS referred from ‘The flora of Osmanabad’ by V.N. Naik Venus Publication March 1979.N.B. :Cl- Climber; T-Tree; H-Herb; S-Shrub ; SS-Scandant Shrub A = Anemophilous,E = Entomophilous, EA = Commonly Entomophilous & rarely Anemophilous
 ● = Main flowering period. * = Irregular flowering periods. - = No flowering period.

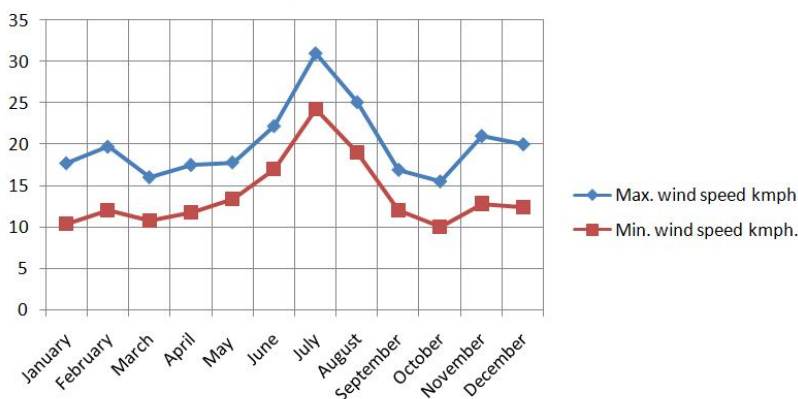
Graphical presentation of pollen grains per meter cube per year.



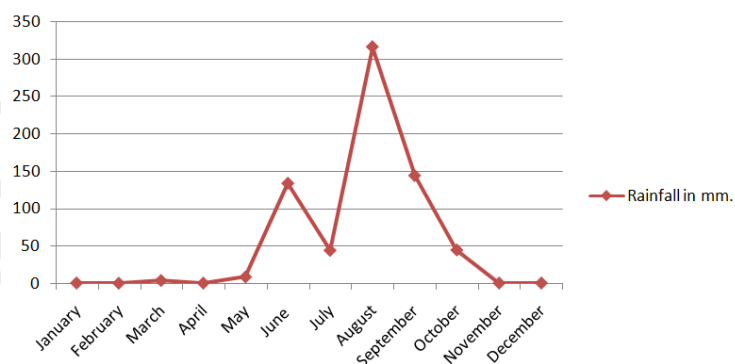
Temperature Jan to Dec 2017



Wind speed Jan to Dec 2017



Rainfall (mm) Jan to Dec 2017.



CONCLUSION:

In the present investigation 26 pollen types were traced in the atmosphere of Osmanabad city. Pollen availability is correlated with meteorological factors. Most of pollen grains concentrations to the total air palynospora were observed during the month of August to January. Grass pollen contributed highest percentage of contribution (36.90%) to the total air palynospora. Pollen calendar will give an idea about forthcoming pollen load and help to allergic patient, medical consultant etc.

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