

RESEARCH ARTICLE

Impact of polluted air on pollen production of plants from industrial area of Nagpur

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Manuscript details:	ABSTRACT
<p>Date of publication 18.10.2014</p> <p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Jaiswal RN and Kalkar SA (2014) Impact of polluted air on pollen production of plants from industrial area of Nagpur, Int. J. of Life Sciences, 2014, Special Issue A2: 141-142.</p> <p>Copyright: © Author(s), This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>Pollen grain is male reproductive unit of plant and pollen production influences pollination, fertilization and ultimately productivity of the plant. Pollen physiological aspects like pollen production of plants in <i>Delonix regia</i>, <i>Butea monosperma</i>, <i>Cassia fistula</i> and <i>Lagerstroemia speciosa</i> were carried out in MIDC Industrial Area, Hingna, Nagpur and Civil lines area was taken as control area for experimental purpose. The studies were carried out throughout blooming period at fortnightly intervals. It was observed the average pollen production of the experimental plants in industrial area was comparatively less than control area. It is essential to recognize allergenic contributors in each area. Hence, the present studies will be helpful to add some knowledge to various fields like agriculture, palynology, aerobiology and allergy.</p> <p>Keywords: Pollen production, palynology, aerobiology, allergy.</p> <p>INTRODUCTION</p> <p>Role of pollen production in pollination and fertilization was studied by Khanduri (2011). The number may vary from plant to plant with reference to its mode of pollination. Industrial area is one of the highly polluted areas in any country. Harmful emissions from various types of industries & gaseous pollutants released in the atmosphere by it are not only harmful for human health but it also affects plants in many ways Over the centuries, concurrent with industrialization and population growth, air pollution has increased from a local nuisance to a global problem. Air pollution can affect pollen grains indirectly via the soil. If a plant grows in polluted soil, its physiological functions may change and affect the properties of the developing pollen grains (Helender <i>et al</i>; 1997). The number may vary from plant to plant with reference to its mode of pollination. <i>Delonix regia</i> , <i>Butea monosperma</i> , <i>Cassia fistula</i> and <i>Lagerstroemia speciosa</i> found grown in various areas of Nagpur. The survey of these plants was carried out at fortnightly intervals in MIDC area, it is considered as one of polluted area of Nagpur. Civil lines area was taken as control, pollen production during their blooming period was carried out in both the area. The purpose of the study was to know effects of industrial emissions in the air on pollen production and hence to know its allergenic potential.</p>

MATERIAL AND METHODS

The survey was carried out from Jan 2011 to Jan 2012, pollen production was carried out during the flowering period of all plants of both industrial and non industrial area, , *Butea monosperma* Feb-March, *Lagerstroemia parviflora* March to May, *Cassia fistula* end of April to first week of June, *Delonix regia* April to June . Pollen production per flower was done by method suggested by Erdtman (1943). From fully mature bud, anthers were collected and crushed in 50% glycerin filtered, then dispersed uniformly in a test tube making total volume up to 10ml. Standardization of dropper was made by confirmation that 20 drops of suspension make the volume of 1ml. One drop of each suspension was taken on four slides with the help of dropper and covered with cover slip. Four such readings from a same suspension were taken and then mean number of pollen production was calculated. Thus 8 such buds were utilized for study and from that total number of pollen grains per flower was calculated.

RESULT AND DISCUSSION

It was found that among five experimental plant studied in Industrial and control area pollen production was highest in *Delonix regia* 41,942 and 53,812, *Cassia siamea* 29,674 and 36,516 *Lagerstroemia speciosa* 29,390 and 34,979 *Butea monosperma* 20,991 and 30,307 *Cassia fistula* 19,145 and 28,187 respectively (Table 1 and Figure 1).

The estimation of total pollen production per plant is useful not only from an aerobiological but also from an agronomical stand point, as the production of seeds often depends on the production of pollen.(Faegri and Iversen, 1989; Cour and Campo, 1980; Allison 1990; Campbell and Halama, 1993).

Table 1: Pollen Production in Experimental Plants

Plant Name	Average no. of pollen production per flower during whole blooming period	
	(Indl. Area)	(Control Area)
<i>Butea monosperma</i>	20,991	30,307
<i>Delonix regia</i>	41,942	53,812
<i>Cassia fistula</i>	19,145	28,187
<i>Cassia siamea</i>	29,674	36,516
<i>Lagerstroemia speciosa</i>	29,390	34,979

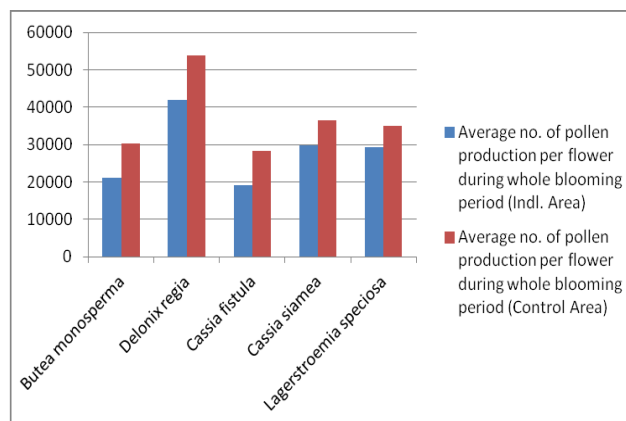


Fig. 1: Pollen Production in Experimental Plants of Industrial (Indl) and Control area

Knowledge of anthesis and pollen production is essential to study of pollination, developing a functional model for forecasting pollen concentrations and to understand more about the ecological background levels the pollen production. Plants being constantly exposed to different air pollutant, shows specific response in the form of injury symptoms. The pollen production was found comparatively less in industrial area than area, which may be due to industrial air pollution. Gaikwad *et al.* (2006) conducted study on plant bioindicator & observed that they are very sensitive & affected by increased atmospheric pollution. Polluted air of industrial area might be responsible for this physiological effect and thus pollen can act as bio indicator of air pollution.

REFERENCES

Allison TD (1990) Pollen production and plant density affect pollination and seed production in *Taxus canadensis*. *Ecology*, 71: 516-522.

Campbell, DR and KJ Halama, (1993) Resource and pollen limitations to lifetime seed production in natural plant population. *Ecology*, 74: 1043-10

Cour P and M Van Campo (1980) Prevision d recoletesa partir de l'analyse du contenu

Erdtman G (1943) An Introduction to Pollen Analysis. *Chronica Botanica* Co

Faegri K and J Iversen (1989) Textbook of Pollen Analysis. 4th ed. K. Faegri, PE Kalland and th K.Krzywinski. J. Wiley and Sons, Chichester/ NewYork/ Brisbane/ Toronto/ Singapore.

Gaikwad PD *et al.* (2006) *Bull.Mater.Sci.*29.169.

Helender Savolainenj and Ahlholmj (1997) Effects of air pollution and other environmental factors on birch pollen allergens. *Allergy*3: 1207-1214.

Khanduri VP (2011) Variation in Anthesis and Pollen Production in Plants. *American- Eurasian J. Agric. And Environ. Sci.*, 11 (1): 834-839.