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SHAPES AND SIZES OF POLLEN GRAINS OF SOME COMMON HERBS AND SHRUBS OF KARACHI

Toqeer Ahmed Rao, Moinuddin Ahmed, Abdul Hakeem Shaikh, Nasrullah Khan and Syed Sadruddin Hussain

*Department of Botany Federal Urdu University, Gulshan-e-Iqbal, Karachi, Pakistan-75300*Corresponding Author: toqeerrao@yahoo.com

ABSTRACT

A palynological study of 29 common plant species representing 28 genera and belonging to 23 families present in Karachi has been carried out. This study is based on the flowering conditions of plants. The flowers were divided into two major groups i.e., plants with full flowering bloom and rare flowering in different months of the year. This study is the first phase of our research work and provides some basic information about the size and shape (under ordinary microscope) of some common pollen grains found in Karachi.

Key Words: Ordinary microscope, Pollen shape, Pollen size, P/E ratio, Karachi.

INTRODUCTION

Pollen grain investigations have been carried out by various workers (Nair, 1965; Qaiser & Perveen, 2004; Perveen and Qaiser, 2004). Their main focus was identification and classification (taxonomy) of plants of Pakistan on the basis of pollen information. Perveen *et al* (2007) carried out airborne pollen survey of Karachi and adjacent areas in relation to allergy. The identification of pollen is like an entering a world of great variation in size, shape and structure. Modern microscopic techniques are, of course, available for pollen morphology and reference (Rhal, 2008), this study provides basic information about pollen grains of some ornamental and wild plants of Karachi (24^o 51' N; 67^o 02' E) through ordinary compound microscope with simple technique to avoid costlier electron microscopy. The purpose of the present investigation was to record shape and sizes of the pollen flora of Karachi.

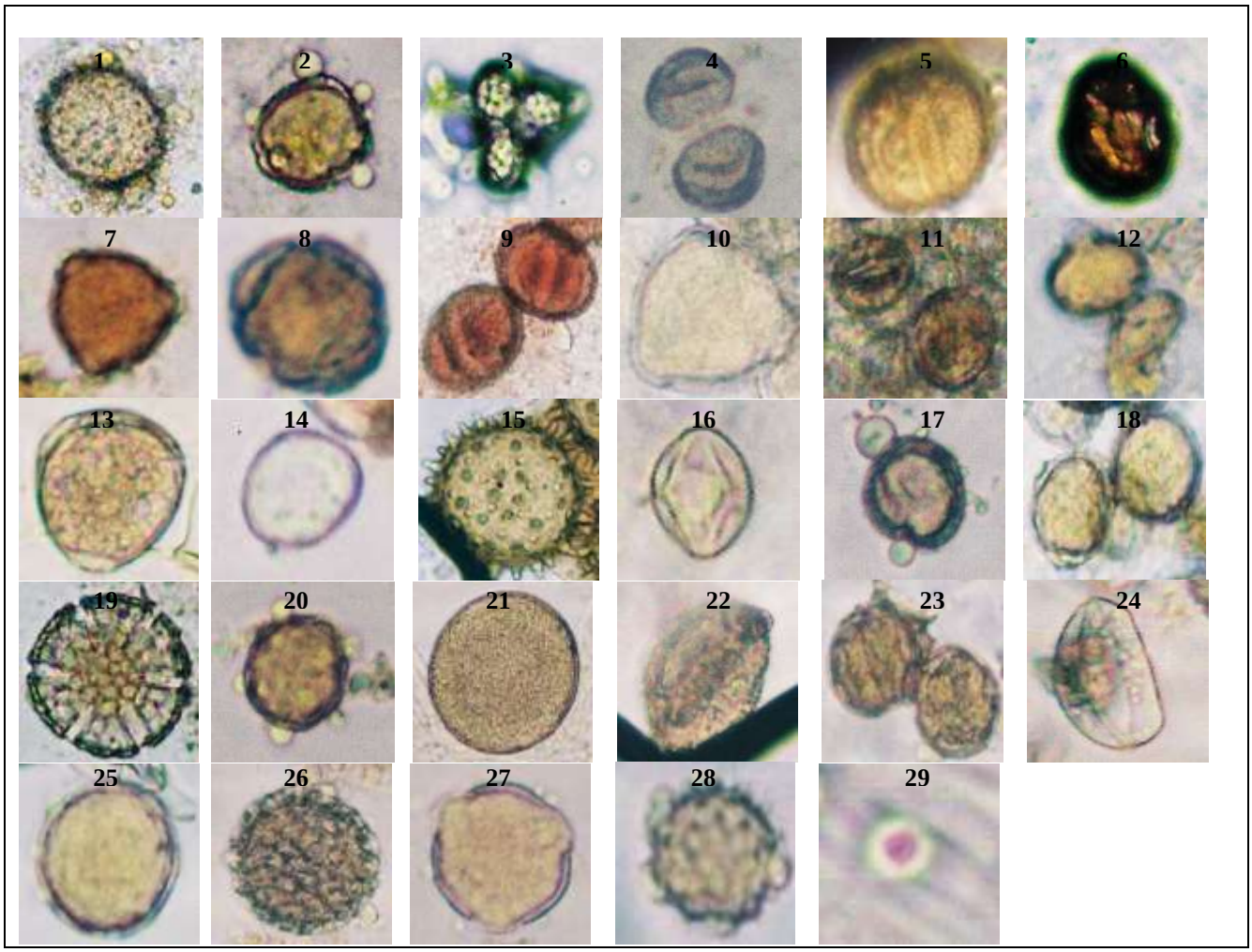
MATERIALS AND METHODS

The sampling sites are Malir, Korangi, Metroville, Gulshan-e-Maymar and Lines Area. The Flowers from the plants from various localities were collected. The pollen grains were sprinkled with water, while some anthers were opened and teased by the help of sterilized needle on glass slide. The pollen grains sprinkled on glass slide were mounted in glycerine and covered with a cover slip. The outer borders of cover slip were also covered with nail polish. For the identification the slide were examined under 100x (10x eye piece & 10x objective lens) magnification of compound microscope model NICON-YS 100.

RESULT AND DISCUSSION

A total of 29 common plants species represented 28 genera belonging to 23 families collected from different areas of Karachi are presented in Table 1, while shape, size and P/E (Polar axis: Equitorial diameter) ratio of each plant pollen grain is presented in Table 2. Figs. 1 to 29 provide photographs for the morphology of pollen grains of 29 species from Karachi.

Flowering, at the time of sampling, was on bloom in *Allamanda cathartica, Atriplex stocksii, Callistemon lanceolatus, Senna holocericea, Clerodendron inerme, Cressa cretica, Corchorus trilocularis, Ixora rosea, Jasminum grandiflorum, Murraya paniculata, Ocimum bascilicum, Parkinsonia aculeata, Portulaca quadrifida, Portulaca grandiflora, Quisqualis indica, Rheo discolor, Thevetia neriifolia, Trianthema pentandra, Tridax procumbens* and *Zygophyllum* simplex from mid of July to the first week of August (Table 1). *Bogainvillea glabra, Ceasalpinnia pulcherimma, Citrullus colocynthis, Clitoria ternatea, Duranta repens, Hibiscus rosa-sinensis and Rosa indica* show highest bloom from 12^{th} September to 19^{th} November. During this period *Abutilon indicum, Cucumis callosus* produced flowers rarely.



Figures. 1-29. Show the pollen grains of 1- *Abutilon indicum*, 2- *Allamanda cathartica*, 3- *Atriplex griffithii*, 4- *Bogainvillea glabra*, 5- *Ceasalpinia pulcherrima*, 6- *Callistemon lanceolatus*, 7- *Senna holocericea*, 8- *Clerodendron inerme*, 9- *Citrullus calocynthis*, 10- *Clitoria ternatea*, 11-*Cressa cretica*, 12- *Corchorus trilocularis*,- 13- *Cucumis callosus*, 14- *Duranta repens*, 15- *Hibiscus rosa-sinensis*, 16- *Ixora rosea*,17- *Jasminum grandiflorum*,18- *Murraya paniculata*, 19- *Ocimum bascilicum*, 20- *Parkinsonia aculeata*, 21- *Portulaca quadrifida*, 22- *Portulaca grandiflora*, 23- *Quisqualis indica*, 24- *Rheo discolor*, 25- *Rosa indica*, 26- *Thevetia neriifolia*, 27- *Trianthema pentandra*, 28- *Tridax procumbens* and 29- *Zygophyllum simplex*.

Among the species investigated, largest pollen grain was of *H. rosa-sinensis* (130 x 130 µm) and smallest of *Zygophyllum simplex* (10x10 µm) (Table 2). The P/E ratios of pollen grains of the above mentioned species ranged from 1 to 2 (Table 2). Spheroidal pollens had P/E ratio of 1, subprolate 1.25, subobvate 0.8 to 1.0, perprolate 2. Our results are in accordance to Erdtman (1943) who reported that majority of pollens are spheroidal with P/E ratio (Polar axis: Equitorial diameter) ranging from 7: 8 to 8: 7. Our results are in compliance with this proposition. He also presented the P/E ratio of Oblate (8: 8 to 7: 8), suboblate (6: 8 to 7: 8), subprolate (8: 7 to 8: 6) and perprolate (>8: 4) pollens. The table No.2 also indicate similar P/E ratio of under study pollen grains. Photographs of these pollen grains were clearly classified according to above described shapes. (Fig, 1 to 29).

Table 1.Date of pollen collection and locality of plants.

S. NO.	DATE OF COLLECTION	LOCATION	PLANT NAME	FAMILY
1.	16-07-2007	Malir	*Portulaca grandiflora*	Portulaceae
2.	16-07-2007	Malir	*Portulaca quadrfida*	Portulaceae
3.	18-07-2007	Gulshan-e-Maymar	*Rheo discolor*	Commelinaceae
4.	18-07-2007	Malir and Metroville	*Trianthema pentandra*	Aizoaceae
5.	20-07-2007	Malir, Lines Area, Gulshan-e-Maymar	*Duranta repens*	Verbanaceae
6.	02-08-2007	Gulshan-e-Maymar	*Tridax procumbens*	Asteraceae
7.	02-08-2007	Gulshan-e-Maymar	*Thevetia neriifolia*	Apocynaceae
8.	02-08-2007	Gulshan-e-Maymar	*Cressa cretica*	Convolvulaceae
9.	04-08-2007	Malir, Metroville and Korangi Area	*Ocimum bascilicum*	Lamiaceae
10.	05-08-2007	Metroville and Korangi Area	*Callistemon lanceolatus*	Myrtaceae
11.	05-08-2007	Malir and Gulshan-e-Maymar	*Zygophyllum simplex*	Zygophyllaceae
12.	07-08-2007	Malir	*Atriplex griffithii*	Chenopodiaceae
13.	07-08-2007	Malir, Metroville and Korangi Area	*Parkinsonia aculeata*	Caesalpiniaceae
14.	07-08-2007	Malir and Gulshan-e-Maymar	*Allamanda cathartica*	Apocynaceae
15.	07-08-2007	Lines Area and Gulshan-e-Maymar	*Quisqualis indica*	Combretaceae
16.	07-08-2007	Malir, Metroville and Gulshan-e-Maymar	*Clerodendron inerme*	Verbenaceae
17.	07-08-2007	Malir and Gulshan-e-Maymar	*Murraya paniculata*	Rutaceae
18.	07-08-2007	Malir, Metroville and Gulshan-e-Maymar	*Jasminum grandiflorum*	Oleaceae
19.	20-08-2007	Metroville and Gulshan-e-Maymar	*Ixora rosea*	Rubiaceae
20.	29-08-2007	Malir, Metroville and Korangi Area	*Senna holocericea*	Caesalpiniaceae
21.	10-09-2007	Malir, Metroville and Korangi Area	*Corchorus trilocularis*	Tiliaceae
22.	12-09-2007	Malir and Metroville	*Cucumis callosus*	Cucurbitaceae
23.	22-09-2007	Metroville and Gulshan-e-Maymar	*Citrullus colocynthis*	Cucurbitaceae
24.	22-09-2007	Malir and Gulshan-e-Maymar	*Clitoria ternatea*	Papilionaceae
25.	15-10-2007	Metroville and Gulshan-e-Maymar	*Bogainvillea glabra*	Nyctaginaceae
26.	16-11-2007	Malir and Metroville	*Hibiscus rosa-chinensis*	Malvaceae
27.	16-11-2007	Malir and Metroville	*Caesalpinia pulcherrima*	Caesalpiniaceae
28.	19-11-2007	Malir and Gulshan-e-Maymar	*Rosa indica*	Rosaceae
29.	05-04-2008	Gulshan-e-Maymar	*Abutilon indicum*	Malvaceae

Table 2. Shape, size and P/E ratio of pollens of some common plants of Karachi.

S. NO.	PLANT NAME	FAMILY	CONDITION	SIZE (µm)	P/E Ratio	SHAPE
1.	*Portulaca grandiflora*	Portulaceae	Extreme	80x80	1	Spheroidal
2.	*Portulaca quadrfida*	Portulaceae	//	80x80	1	//
3.	*Rheo discolor*	Liliaceae	//	40x20	2	Perprolate
4.	*Trianthema pentendra*	Aizoaceae	//	50x40	1.25	Subprolate
5.	*Tridax procumbens*	Compositae	//	30x30	1	Spheroidal
6.	*Thevetia neriifolia*	Apocynaceae	//	60x60	1	//
7.	*Cressa cretica*	Convolvulaceae	//	30x20	1.5	Suboblate
8.	*Ocimum bascilicum*	Labiatae	//	50x50	1	//
9.	*Callistemon lanceolatus*	Myrtaceae	//	30x30	1	//
10.	*Zygophyllum simplex*	Zygophyllaceae	//	10x10	1	//
11.	*Atriplex griffithii*	Chenopodiaceae	//	20x20	1	//
12.	*Parkinsonia aculeata*	Caesalpiniaceae	//	30x30	1	//
13.	*Allamanda cathartica*	Apocynaceae	//	50x50	1	//
14.	*Quisqualis indica*	Combretaceae	//	30x30	1	//
15.	*Clerodendron inerme*	Verbenaceae	//	50x50	1	//
16.	*Murrya paniculata*	Rutaceae	//	30x30	1	//
17.	*Jasminum grandiflorum*	Oleaceae	//	20x20	1	//
18.	*Ixora rosea*	Rubiaceae	//	20x20	1	//
19.	*Senna holocericea*	Caesalpiniaceae	Extreme	30x30	1	//
20.	*Corchorus trilocularis*	Tiliaceae	//	30x30	1	//
21.	*Cucumis callosus*	Cucurbitaceae	Rare	40x50	0.8	Suboblate
22.	*Citrullus colocynthis*	Cucurbitaceae	Extreme	80x80	1	Spheroidal
23.	*Clitoria ternatea*	Papilionaceae	//	70x70	1	//
24.	*Bogainvilla glabra*	Nyctaginaceae	//	40x40	1	//
25.	*Hibiscus rosa-sinensis*	Malvaceae	//	130x130	1	//
26.	*Caesalpinia pulcherrima*	Caesalpiniaceae	//	60x60	1	//
27.	*Rosa indica*	Rosaceae	//	30x30	1	//
28.	*Duranta repens*	Verbenaceae	//	30x30	1	//
29.	*Abutilon indicum*	Malvaceae	Rare	60x60	1	//

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