

BASELINE INVENTORY FOR ANGIOSPERMIC POLLEN DIVERSITY IN OSMANABAD DISTRICT (MS), INDIA

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ABSTRACT

Study of pollen diversity in Osmanabad district was carried out in the year 2005-06. Present paper deals with the baseline inventory for pollen diversity. About 40 angiospermic families were studied for its pollen morphological studies. Out of which 35 families are from Dicotyledons and only 05 families are from Monocotyledons group. In all, 77 genera and eighty two 82 species from Dicotyledons and 8 genera with 8 species from monocots were studied. Emphasis is also given on Intraspecific and allergenic characteristics of the pollens.

KEYWORDS: Pollen study, Osmanabad, Pollen diversity

INTRODUCTION

Palynology is one of the most widely used research tools in Quaternary studies (Edwards 1983). The District of Osmanabad is the southernmost district in Maharashtra State situated between 17° 35' and 18° 40' north latitude and 75° 16' and 76° 40' east longitude. The district has negligible forest resources mainly concentrated in Tuljapur tahsil, which is divided into three beats, placed under the charge of the round officers. The forests in the district cover an area of only 15.411 km. The average annual rainfall in the district is 882.1 mm. December is generally the coldest month with the mean daily maximum temperature at about 29.5° C and the mean daily minimum at about 15°C. May is generally the hottest month with the mean daily maximum temperature at about 40°C and the mean daily minimum at about 25°C (Anonymous 1972).

Data derived from pollen studies can be used to provide an indication as to the response of natural vegetation to human impacts through history, as well as to climatic and environmental change (Prentice, 1988; Edwards & MacDonald 1991). At the largest spatial scale, pollen data have been used to reconstruct past changes of biomes, using pollen records from entire modern biomes as a basis (Jolly *et al.* 1998; Elenga *et al.* 2000). Pollen study data strengthen predictions of how vegetation is likely to respond to future climatic conditions, thereby providing an indication of the future agricultural and silvicultural potential of various regions (Huntley 1990). Difficulties with the representivity both between and within species are experienced, as some taxa produce far greater quantities of pollen, which are more widely dispersed than others (Birks & Birks 2005). Pollen data require careful interpretation as the representivity of the pollen spectrum is shaped by differences in pollen productivity, dispersal and preservation (Faegri and Iversen 1989). It is useful to think of pollen analysis as a remote sensing instrument, which records the past and present composition of vegetation (Webb *et al.* 1978).

MATERIALS AND METHODS

Survey for collection and identification of plants from Osmanabad district was carried out for about one year i.e. 2005-06. During the collection period, 2-3 visits were made in a month covering the 35 plant vegetation areas, representing the cross section of Osmanabad district. While on field, notes on habitat, occurrence, were noted. Collection of plant specimens were brought to laboratory for further proper identification and processed for herbarium specimens. For identification, standard floras like Flora of British India (Hooker, 1872-1897), Flora of Osmanabad (Naik, 1968) and Flora of Marathwada (Naik 1998) were referred. Voucher specimens are deposited in the Department of Botany, Shri Chhatrapati Shivaji College, Omerga. Identification of pollen grains is done by its micromorphological observations with the help of Microscope at 40x to 100x magnifications. The morphological characteristics of pollen grains are contained in the exine. Acetolysis is method used for pollen grain slide preparation suggested by Erdtman (1952) but slightly modified by Nair (1960).

POLLEN OBSERVATIONS

Pollen observations play an important role in plant systematic studies. The detailed pollen observations by the author are noted here.

***Annona squamosa* L. (ANNONACEAE)** Pollen description: Pollen monosiphonous; in tetrads, Pollen grains mono or biaperturate; monosulcate (mostly, occasionally with two parallel furrows at the equator), 2-celled. Flowering -June – July.

***Argemone mexicana* L. (PAPAVERACEAE)** Pollen description: Pollen Tricolporate with elongated, wide colpi, rounded at their endings, trizonocolpate; Sculptur: Reticulate, thin, scabrate exine. Thin intine, with granular exine remnants. Flowering - Throughout the year.

***Brassica nigra* (L) Koch. (BRASSICACEAE)** Pollen description: Pollen tricolpate, colpi rounded at their end, triangular, circular to elliptical. Wall: reticulate exine, Exine thinner towards the colpi. Flowering—August

***Cleome gynandra* L. (CLEOMACEAE)**

Pollen description: Pollen tricolporate, triangular, with costae, Exine thin, sexine slightly thicker at the polar region than at the equator. Tectum striate-rugulate, Flowering -August

***Abelmoschus ficulneus* (L.) Wt. & Arn. (MALVACEAE)**

Pollen description: Pollen Colporate, Distinct, Pantoporate, colporate, costate spines long, apices pointed, Spheroidal, colporate, Rugulose exine, tectum spinulose. Flowering - July – October

***Abutilon indicum* (L.) Sweet.**

Pollen description: Pollen Spheroidal, colporate, exine thick; tectum spinulose, spines fine, pointed; costae spines long, apices pointed, base bulbous, Flowering - August – November.

***Gossypium hirsutum* L.**

Pollen description: Pollen Colporate, Distinct, Pantoporate, colporate, costate spines long, apices pointed, base bulbous. Spheroidal, colporate, Rugulose, exine; sexine as thick as nexine; tectum rugulose; Flowering -September- January

***Gossypium arboreum* L.**

Pollen description: Pollen colporate, pantoporate, colporate, costate spines long, apices pointed, base bulbous, sparsely distributed; Spheroidal, colporate, rugulose, sexine as thick as nexine; tectum rugulose; Flowering - October - January

***Hibiscus rosa-sinensis* L.**

Pollen description: Pollen Colporate, distinct, pantoporate, colporate, costate spines as long as tectum, apices pointed; Spheroidal, colporate, tectum rugulose; Flowering -Throughout the year.

***Sida acuta* Burm.**

Pollen description: Pollen colporate, pantoporate, colporate, apices pointed, base bulbous. Spheroidal, colporate, rugulose exine; sexine as thick as nexine; tectum spinose; Flowering - Throughout the year.

***Sida cordifolia* L.**

Pollen description: Pollen Pantoporate, colporate, costate spines long, apices pointed, base bulbous, thickly distributed; Spheroidal, colporate, Flowering-Throughout the year.

***Sida rhombifolia* L.**

Pollen description: Pollen Pantoporate, colporate, costate spines long, apices pointed, base bulbous, thickly distributed; Spheroidal, colporate, Flowering – August - November

***Bombax ceiba* L. (BOMBACACEAE)**

Pollen description: Pollen spheroidal, undulating. Amb triangular, interapertural corners rounded; colpi apices acute, finely granulate, reticulations on exine; Flowering -February – April

***Ceiba pentandra* (L.) Gaertn.**

Pollen description: Pollen spheroidal to ellipsoidal, Amb triangular, corners rounded, colpi apices acute, finely granulate; reticulate, collumellate; nexine thinner than sexine. Flowering -January- March

***Tribulus terrestris* L. (ZYGOPHYLLACEAE)**

Pollen description: Pollen spheroidal or oblate-spheroidal, Monads, circular or oval; Exine- sexine thicker than nexine. Tectum coarsely reticulate. Flowering - Throughout the year.

***Biophytum sensitivum* (L.) DC. (OXALIDACEAE)**

Pollen Description: Pollen Tricolpate, colpi long, linear. Exine semitectate, reticulate, homobrochate, sexine thicker than nexine. Monads. Flowering - August – December

***Aegle marmelos* (L.) Corr. in Traus. (RUTACEAE)**

Pollen description: Pollen tetracolporate, spherical, Polar outline circular. Sexine & Nexine not observable. Ectocolpus long, narrow, sunken, Granulate. Flowering - May – June

***Ruta graveolens* L.var. *angustifolia* Hook. f.**

Pollen description: Pollen tetracolporate, spheroidal, circular. Lumina of angular appearance, 3-sided to many sided. Ectocolpus long, narrow, sunken, regular, Granulate Flowering – Throughout the year.

***Ailanthus excelsa* Roxb. (SIMAROUBACEAE)**

Pollen description: Pollens tricolpate; reticulate exine, hexagonal in polar view, elliptical in equatorial view. Thin exine, thickened underneath Flowering - January - February,

***Balanitis aegyptiaca* (L.) Del. (BALANITACEAE)**

Pollen description: Pollen grains Spheroidal, aperturate; 3 and 6 aperturate; colporate and rugate normally tricolporate and 6-rugulate. Flowering -February – November

***Mangifera indica* L. (ANACARDIACEAE)**

Pollen description: Pollen grains aperturate; 3 aperturate; colporate; Prolate- spheroidal, tricolporate, trilobed colpi Sexine thicker than nexine. Tectum striate. Flowering -January- June

***Semecarpus anacardium* L.**

Pollen description: Pollen aperturate; 3 aperturate; colporate; Prolate- spheroidal, tricolporate, trilobed colpi Sexine thicker than nexine. Tectum striate. Flowering - September - November

***Carica papaya* L. (CARICACEAE)**

Pollen description: Pollen spheroidal, exine smooth, hyaline, Prolate, 3-colporate triangular colpi. Sexine is thicker than nexine. Flowering– Throughout the year

***Momordica charantia* L. (CUCURBITACEAE)**

Pollen description: Pollen Tricolporate, Sub-prolate to prolate or oblate-spheroidal, coarsely reticulate, Exine thin, sexine thicker than nexine. Tectum coarsely reticulate. Flowering– June-September

***Abrus precatorius* (FABACEAE)**

Pollen description: Pollen grains Globular, Colpi irregular with slightly tapering ends, pores indistinct. Sexine thicker than nexine. microreticulate, reticulum homobrochate. Flowering- August - September

***Glucine max* (L.) Merr.**

Pollen description: Pollens in polyads, triangular, and semi angular amb. Colpi irregular with slightly tapering ends, pores indistinct. Sexine thicker than nexine. Flowering -August- December

***Medicago sativa* L.**

Pollen description: Pollen grains spheroidal, and semi angular amb. Colpi irregular with slightly tapering ends, pores indistinct. Sexine thicker than nexine. Flowering - December- January

***Bauhinia variegata* L. (CAESALPINIACEAE)**

Pollen description: Prolate, tricolporate, Spherical, colp membrane reticulate, Exine thick. Sexine thicker than nexine. Tectum reticulate-rugulate. Flowering - November - January.

***Caesalpinia pulcherrima* (L.) Roxb.**

Pollen description: Pollen Monads, Prolate, tricolporate, triangular, colp membrane reticulate, Exine thick. Sexine thicker than nexine. Tectum reticulate-rugulate. Flowering - July - December.

***Cassia fistula* L.**

Pollen description: Pollen Sub-prolate, tricolporate, non-angular, colpi divided, Exine thin. Sexine thicker than nexine. Tectum reticulate-rugulate. Flowering - March - June

***Delonix regia* (Boj. ex Hook.) Rof.**

Pollen description: Pollens in clusters. Sub-prolate, tricolporate, triangular colpi. Sexine thicker than nexine. Tectum reticulate-rugulate. Flowering - April August

***Acacia nilotica* (L.) Del. subssp. *indica* (MIMOSACEAE)**

Pollen description: Pollen in cluster, circular; elliptical in equatorial view. Colporate monads, The exine shows a more or less quadrangular, very thin, psilate exine, thin intine, Flowering - June - January

***Mimosa pudica* L.**

Pollen description: Pollen in clusters, Bilateral, circular; elliptical in equatorial view. Colporate monads, The exine quadrangular laesio, thin, psilate exine. Flowering - August - October

***Azadirachta indica* A. Juss. (MELIACEAE)**

Pollen description: Pollen Prolate-spheroidal, 4-colporate, ends of colpi not well-defined. Sexine thinner than nexine. Tectum reticulate. Flowering - January-May

***Melia azadirach* L.**

Pollen description: Pollen Prolate-spheroidal, 3,4-colporate, ends of colpi not well-defined. Sexine thinner than nexine. Tectum reticulate. Flowering - July - September

***Terminalia arjuna* (Roxb.) Wt. & Arn. (COMBRETACEAE)**

Pollen Description : Pollen in monads, prolate-spheroidal, radially symmetrical, Heterocolpate, syncolporate, Exine thick, scabrate, sexine and nexine of same thickness. Flowering - June - August

***Terminalia bellerica* (Gaertn.) Roxb.**

Pollen Description : Pollen monads, Isopolar, prolate-spheroidal, radially symmetrical. Heterocolpate, syncolporate. Exine tectate, scabrate, sexine & nexine of the same thickness. Flowering - March - May.

***Terminalia chebula* Retz.**

Pollen Description : Pollen monads, Isopolar, prolate-spheroidal, radially symmetrical. Heterocolpate, syncolporate. Exine tectate, scabrate, sexine and nexine of same thickness. Flowering - March - May.

***Lawsonia inermis* L. (LYTHRACEAE)**

Pollen description: Pollen grains radially symmetrical, isopolar, colpate, prolate often oblate-spheroidal. Sexine thicker than nexine. Tectum scabrate, prolate. Flowering - April - August.

***Ageratum conyzoides* L. (ASTERACEAE)**

Pollen description: Pollen is monad, tricolporate, circular, tri-zono-colpate with very short, acute colpi. Exine scabrate with extremely short, blunt spines. Thin intine, Flowering - August - April

***Echinops echinatus* Roxb.**

Pollen description: Pollen elliptic, tri-zono-colpate with short, acute colpi. Exine scabrate with extremely short, blunt spines, Thin intine, Flowering - November - May.

***Eclipta alba* (L.) Hassk.**

Pollen description: Pollen spheroidal, tri-zono-colpate with very short, acute colpi. Exine scabrate with blunt spines. Thin intine. Flowering - Throughout the year.

***Helianthus annus* L.**

Pollen description: Pollen circular, tri-zono-colpate with very short, acute colpi. Exine scabrate with short, sharp spines. Thin intine. Flowering - September - December

***Parthenium hysterophorus* L.**

Pollen description: Pollen monad, tricolporate and echinate, circular to semi-angular, tri-zono-colpate with short, Exine scabrate with sharp pointed spines, Thin intine. Flowering - September - December

***Tridax procumbens* L.**

Pollen description: Pollen spheroidal, tri-zono-colpate with very short, acute colpi, Exine scabrate with extremely short, blunt spines. Thin intine. Flowering - Throughout the year.

***Vernonia cineria* (L.) Less.**

Pollen description: Pollens circular, tri-zono-colpate with long, acute colpi, Exine scabrate with extremely short, blunt spines. Thin intine. Flowering - September - December

***Xanthium strumarium* L.**

Pollen Description: Pollen outline circular, tri-zono-colpate with very short, acute colpi, Exine scabrate with extremely short, blunt spines. Thin intine. Flowering - October - February

***Allmanda cathartica* L. (APOCYNACEAE)**

Pollen description: Pollen Isopolar, oblate-spheroidal to suboblate, radially symmetrical, triporate, pores Spherical, with annulus. Exine thin, microrugulate. Flowering - September - October

***Catharanthus roseus* (L.) G. Don.**

Pollen Description: Pollen monads, Isopolar, oblate-spheroidal to suboblate, radially symmetrical, triporate, pores elliptical. Exine thin, microrugulate. Flowering - Throughout the year

***Nerium indicum* Mill.**

Pollen description: Pollen Isopolar, oblate-spheroidal to suboblate, radially symmetrical, triporate, pores elliptical. Exine thin, microrugulate. Flowering - Throughout year.

***Tabernemontana divaricata* (L.) R. Br.**

Pollen Description: Pollen in monads, Isopolar, oblate-spheroidal to suboblate, radially symmetrical, triporate,

pores elliptical, large with annulus. Exine thin, microrugulate. Flowering - Throughout year.

***Thevetia peruviana* (Pers.) K. Schum.**

Pollen Description : Pollen in monads, Isopolar, oblate-spheroidal to suboblate, radially symmetrical, triporate, pores elliptical, large with annulus. Exine thin, microrugulate. Flowering- June – December.

***Asclepias curassavica* L. (ASCLEPIADACEAE)**

Pollen description: Pollen shed in aggregates; in the form of pollinia (one or two per theca). Pollen grains 2-celled. Flowering- Throughout year.

***Ipomoea quamoclit* L. (CONVOLVULACEAE)**

Pollen description: Pollen is monad and tricolporate. The shape of pollen in polar view is circular to semi-circular and in equatorial view is prolate. Flowering – September – December.

***Cuscuta reflexa* Roxb. (CUSCUTACEAE)**

Pollen Description: Pollen hexacolpate, pantocolpate, suboblate to prolate spheroidal; circular in polar view, surface with granules; exine scabrate. Flowering - September – December

***Datura stramonium* L. (SOLANACEAE)**

Pollen description: Pollen tricolporate, zonoaperturate, Exine ; Sexine as thick as nexine. Pollen elliptic, polar view rounded trilobed. Flowering - July - October.

***Spathodia campanulata* P. (BIGNONIACEAE)**

Pollen description: Pollens Isopolar, spheroidal, radially symmetrical, amb circular, tricolporate, wide, elliptic. Exine thin, tectate, psilate, sexine and nexine of same thickness. Flowering – Sept – Feb.

***Blepharis linarifolia* Pers. (ACANTHACEAE)**

Pollen description: Pollen grains prolate, tricolpate, sexine thinner than nexine. Tectum foveolate. Flowering – July -September.

***Lepidagathis cristata* Willd.**

Pollen description: Pollens isopolar, spheroidal, prolate, porate, colpate, amb trilobed or triangular, colpate membrane scabrate. Tectum reticulum coarsely foveolate. Flowering - September - February.

***Lantana camara* L. var. *aculeata* (L.) Mold. (VERBENACEAE)**

Pollen description: Pollen semi angular polar view and prolate spheroidal in equatorial view. Monads, type: tricolporate, exine sculpturing smooth. Flowering - Throughout the year.

***Clerodendrum serratum* (L.) Moon.**

Pollen description: Pollen grains symmetrical, isopolar, prolate- spheroidal, tricolporate, sexine as thick as nexine. tricolpate, tectum very finely reticulate with spinules. Flowering - September – December

***Clerodendrum multiflorum* (Burm f.) O. Ktze.**

Pollen description: Pollens symmetrical, tricolpate, isopolar, prolate- spheroidal, tricolporate, tectum very finely reticulate with spinules. sexine as thick as nexine. Flowering - September – February

***Verbena bipinnatifida* Schau.**

Pollen description: Pollen sub angular in polar view and sub-prolate in equatorial view. Monads, type:

tricolporate, exine sculpturing granular smooth. Flowering - November –February

***Vitex negundo* L.**

Pollen description: Pollen circular-lobate polar view and prolate spheroidal in equatorial view. Monads, type: tricolporate, exine sculpturing smooth. Flowering - July – February

***Hyptis suaveolens* (L.) Poit. (LAMIACEAE)**

Pollen description: Pollen grains symmetrical, isopolar, sub rplate, 3-6-colpate, colpate membrane granulated, sexine thinner than nexine, tectum reticulate. Flowering - September – February

***Ocimum basilicum* L.**

Pollen description : Pollens symmetrical, isopolar, sub prolate, 3-6-colpate, trilobed, membrane granulated, sexine thinner than nexine, tectum reticulate. Flowering - September – December

***Boerhaavia repens* L. var. *diffusa* (L.) Hook. (NYCTAGINACEAE)**

Pollen description: Pollens Oblate-spheroidal, pantoporate, pores 7-10, circular, sunken. Exine thick, sexine thinner than nexine. Tectum tubuliferous and spinulose. Flowering - July - March.

***Achyranthes aspera* L. (AMARANTHACEAE)**

Pollen description : Pollen grain with 30-40 pores, monads, Pantoporate, reticulate, circular sub-lobate. Exine have rough surface. Sexine as thick as nexine. Flowering - September – December

***Aerva lanata* (L.) Juss.**

Pollen description : Pollen grains with 30-40 pores, monads, Pantoporate, reticulate, circular sub-lobate. Exine rough. Sexine as thick as nexine. Flowering - September – February

***Alternanthera sessilis* (L.) R. Br.**

Pollen description: Pollen grains with 20-25 pores, monads, Pantoporate, reticulate, circular sub-lobate. Exine smooth. Sexine as thick as nexine. Flowering - July- March

***Amaranthus spinosus* L.**

Pollen description: Pollen grains, spheroidal with 30-65 pores. The exine is thin and granular. Grains are 18-31 micrometers in diameter. Flowering – July – December

***Celosia argentea* L. var *argentea* L.**

Pollen description: Pollen grains with 30-35 pores, monads, Pantoporate, reticulate, circular lobate. Exine rough. Flowering - September – November

***Chenopodium album* L.**

Pollen description: Pollens circular, periporate, pantoporate, pollen grain with 30-70 pores. Membrane finely granulate. Exine scabrate with columellae; thin intine. Flowering - September - December

***Digera muricata* (L.) Mart.**

Pollen description: Pollen grains spheroidal with 30-45 pores. Monads, Pantoporate, reticulate, circular lobate. The exine is thin and granular. Flowering –June – February

***Gomphrena serrata* L.**

Pollen description: Pollen circular, periporate, pantoporate with numerous pores. Membrane finely

granulate. Pantoporate, reticulate, Exine scabrate, thin intine. Flowering – June – January

***Acalypha ciliata* Forsk. (EUPHORBIACEAE)**

Pollen description: Pollens oblate-spheroidal; Monads. Isopolar, prolate-spheroidal, radially symmetric, 3-4 porate. The sexine is thin and slightly thickened at the pores. Flowering – August – December

***Euphorbia hirta* L.**

Pollen description: Pollens in monads. Isopolar, ellipsoidal, radially symmetric, tricolpodiporate, diploporate, Exine, tectate, rugulate, striate, sexine thicker than nexine. Flowering - Throughout year.

***Euphorbia nerifolia* L.**

Pollen description: Pollens in monads. Isopolar, prolate-spheroidal, tricolpodiporate, diploporate, circular. Exine, tectate, rugulate, striate, sexine thicker than nexine. Flowering - February – March

***Phyllanthus amarus* Schumach, & Thonn.**

Pollen Description : Pollens monads, Isopolar, prolate-spheroidal, radially symmetric, tricolpodiporate, diploporate. Exine tectate, rugulate, striate, sexine thicker than nexine. Flowering - August - April.

***Ricinus communis* L.**

Pollen description: Pollens oblate-spheroidal; Monads. Isopolar, prolate-spheroidal, triporate, granular. The sexine is thin. Flowering - December – May

***Cannabis sativa* L. (CANNABACEAE)**

Pollen description: Pollens Spherical, subulate to oblate; triporate, Scabrate, Scabrate, exine relatively thin than intine, much thickened oncus. Flowering - September – November

***Casurina equisetifolia* J. R. & G (CASURINACEAE)**

Pollen description: Pollens circular or triangular, side view elliptical or circular, triporate, scabrate exine, annularly thickened. Intine thin, Flowering - January – May

***Canna indica* L. (CANNACEAE)**

Pollen description: Pollen grains nonaperturate; 2-celled. Flowering - Throughout the year

***Aloe vera* (L.) Burm f. (LILIACEAE)**

Pollen description: Pollen grains monocolpate. Colpus ornamented, reticulate & scabrate, irregular. Very small lumina. Globular clumps of exine (pollen kit). Flowering - December – May

Asparagus racemosus* Wild. var. *javanicus

Pollen description: Pollens in Monads, monosulcate, ellipsoidal. Exine semitectate, perforate, reticulate, reticulate-rugulate, rugulate. Ectexine is thicker than endexine. Flowering - - October - December.

***Alocasia indica* (Lour.) Koch. (ARACEAE)**

Pollen description: Pollens Oval; inaperturate; psilate; exine thickness: 1.3 µm. Spadix-August - November.

***Cynodon dactylon* (L.) Pers. (POACEAE)**

Pollen description: Pollens Spherical; monoporate; round annulate pore; coarsely scabrate; exine thin. Flowering – Throughout the year.

***Digitaria ciliaris* (Retz.) Koel.**

Pollen description: Pollens Spherical; monoporate; round annulate pore with operculum often present; scabrate; exine thicker than intine. Flowering– July - December.

***Zea mays* L.**

Pollen description: Pollens circular to oval: monoporate, porus with operculum and a distinct annulus, Wall thin, scabrate exine, mostly thin intine. Flowering-July - December.

***Cocos Nucifera* L. (ARECACEAE)**

Pollen description: Pollens trichotomocolpate,, bilateral, ovoidal and monosulcate. Sexine tegillate with smooth or undulating tegillum ,irregularly spaced pits, granulate. Flowering - February - May

CONCLUSION

During this baseline inventory, about forty (40) families of angiosperms were studied for its pollen morphological and diversity studies. Out of which thirty five (35) families are from Dicotyledons and only five (05) families are from Monocotyledons group. Pollen morphology and diversity of seventy seven (77) genera and eighty two (82) species from Dicotyledons and eight (8) genera with eight (8) species were observed under the microscope. Thus, in all ninety (90) angiospermic species are studied under this project. Intra-specific comparative studies for pollen diversity were done for *Argemone* (*A. mexicana* and *A. ochroleuca*), *Sida* (*S. acuta*, *S. cordifolia* and *S. rhomboidea*), *Gossypium* (*G. arboreum* and *G. hirsutum*), *Terminalia* (*T. arjuna*, *T. bellerica* and *T. chebula*), *Clerodendrum* (*C. multiflorum* and *C. serratum*) and *Euphorbia* (*E. hirta* and *E. nerifolia*) . Out of all ninety (90) angiospermic species studied under this project, ten (10) are found allergic as per the study of Singh A. B. and Pawan Kumar (2003). These are *Cynodon dactylon*, *Cannabis sativa*, *Chenopodium album*, *Parthenium hysterophorus*, *Amaranthus spinosus*, *Ricinus communis*, *Xanthium strumarium*, *Ageratum conyzoides*, *Argemone mexicana* and *Ailanthus excelsa*. Out of these ten species only one species i.e. *Ailanthus excelsa* is tree species. This indicates that 90% allergic pollens are either from herbaceous or shrubby species.

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LITERATURE CITED

- Anonymous. 1972.** *Maharashtra State Gazetteers (Govt. of Maharashtra) Osmanabad District (Revsd. Edn.)* Directorate of Government Printing, Stationery and Publications, Maharashtra State.
- Birks HH and Birks HJB. 2005.** Reconstructing Holocene Climates From Pollen And Plant Macrofossils. In: A. Mackay, R.W. Battarbee, H.J.B. Birks And F. Oldfield (Eds), *Global Change In The Holocene*, Hodder Arnold, London, Pp. 342-357.
- Birks HJB. 1981.** The Use of Pollen Analysis in the Reconstruction of Past Climates: A Review. In: T.M.L. Wigley, M.J. Ingram and G. Farmer (Eds) *Climate And History. Studies In Past Climates And Their Impact Of Man*, Cambridge University Press, Cambridge, Pp. 111-138.
- Devarkar VD. 2011.** *Study of Allergenic Pollens from Ethnobotanically Important Plants from Osmanabad District.* In *Lifesciences Leaflets*. **13**: 427 -434.
- Edwards KJ. and Macdonald GM. 1991.** Holocene Palynology: li Human Influence And Vegetation Change. *Progress In Physical Geography*, **15**:364-391.
- Elenga H, Peyron O, Bonnefille R, Jolly D, Cheddadi R, Guiot J, Andrieu V, Bottema S, Buchet G, Debeaulieu J, Hamilton A, Maley J, Marchant R, Perezobiol R, Reille M, Riollet G, Scott L, Straka H, Taylor D, Van Campo E, Vincens A, Laarif F and Jonson H. 2000.** Pollen-Based Biome Reconstruction for Southern Europe and Africa 18,000 Yr Bp. *Journal of Biogeography*. **27**: 621-634.
- Erdtman G. 1952.** Pollen Morphology and Plant taxonny. Angiosperms, Stockholm.
- Faegri K. and Iverson J. 1989.** *Textbook of Pollen Analysis*, John Wiley & Sons, Chichester.
- Hooker JD. 1872-1897.** *The Flora of British India*. Vol. I - VII. London.
- Huntley B. 1990.** Studying Global Change: The Contribution of Quaternary Palynology. *Palaeogeography, Palaeoclimatology, Palaeoecology*. **82**: 53-61.
- Jolly D, Prentice IC, Bonnefille R, Ballouche A, Bengo M, Brenac P, Buchet G, Burney DA, Cazet JP, Cheddadi R, Ederh TM, Elenga H, Elmoutaki S, Guiot J, Laarif F, Lamb HF, Lezine AM, Maley J, Mbenza M, Peyron O, Reille M, Reynaud-Farrera I, Riollet G, Ritchie JC, Roche E, Scott L, Semmanda I, Straka H, Umer M, Van Campo E, Vilimumbalo S, Vincens A and Waller M. 1998.** Biome Reconstruction from Pollen and Plant Macrofossil Data Fro Africa and the Arabian Peninsula at 0 and 6000 Years. *Journal of Biogeography*. **25**: 1007-1027.
- Naik VN. 1998.** *Flora of Marathwada*. Vol. I & II. Amrut Prakashan, Aurangabad, India.
- Naik VN. 1998.** *Marathwadyatil Samanya Vanaushadhi*. Amrut Prakashana, Aurangabad.
- Nair PKK. 1960.** A Modification in the Method of Pollen Preparation. *Ibid.* 19C (1) : 26 -27
- Nair PKK. 1966.** *Essentials of Palynology*, Asia Publishing House, Bombay
- Prentice IC. 1988.** *Records of Vegetation in Time and Space: The Principles of Pollen Analysis*. In: B. Huntley and T. Webb lii (Eds), *Vegetation History*, Kluwer Academic Publishers, Dordrecht, Pp. 16-42.
- Singh AB, Pawan K. 2003.** Aeroallergens in Clinical Practice of Allergy in India -An Overview *Ann Agric Environ Med* 2003, 10, 131-136.
- Webb TI, Laseski RA and Bernard JC. 1978.** *Sensing Vegetational Patterns with Pollen Data: Choosing the Data.* *Ecology*. **59**: 1151-1163.