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### PINJORIAPOLLIS, A NEW FOSSIL POLLEN FROM THE PINJOR FORMATION (UPPER SIWALIK) EXPOSED NEAR CHANDIGARH

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A PALYNOFLORA consisting of 19 genera and 23 species of fungal and pteridophytic spores and gymnospermous and angiospermous pollen grains from the Pinjor Formation (Upper Siwalik) exposed near Chandigarh has been recorded by Saxena and Singh<sup>2</sup>. In this assemblage one genus, *viz.*, *Pinjoriapollis* is new. The systematic description of this genus along with its two new species, *viz.*, *P. magnus* and *P. lanceolatus* is given below.

Genus—*Pinjoriapollis* gen. nov.

Type species.—*Pinjoriapollis magnus* sp. nov.

Generic diagnosis.—Pollen grains elliptical or lanceolate in shape (length two and a half times of breadth), heteropolar; large in size, 120–170 × 51–70 μ. Monosulcate, sulcus wide throughout its length, extending

from one end to the other. Exine up to 3.5 μ thick, laevigate, faintly intrapunctate, tegillate.

Comparison.—The present genus is comparable with *Palmidites* Couper in having single furrow (sulcus) and laevigate exine. However, *Pinjoriapollis* can easily be distinguished by its tegillate exine and exceptionally big size (120–170 × 51–70 μ) while *Palmidites* is only 70–88 × 30–57 μ in size. Besides, there is remarkable difference in the length/breadth ratio of the said two genera; in *Pinjoriapollis* length is about two and a half times of the breadth providing it an elongated-elliptical shape; while in *Palmidites* length is little less than twice of its breadth providing it a ± oval shape. The present genus is also comparable with *Arecipites* Wodehouse in being monosulcate but in the latter furrow is closely tight throughout its length, not gapping at its ends, which is not the case with *Pinjoriapollis*. Moreover, the type species of *Arecipites*, *viz.*, *A. punctatus* has minutely pitted exine and thus differs from the present genus. The other comparable genus, *Palmaepollenites* differs from the present genus by its very small size (24 μ in length) and by having a small and narrow sulcus which does not extend from one end to the other and is slightly globular at its ends. *Liliacidites* Couper and *Clavatipollenites* Couper are also monosulcate but are distinguishable by their reticulate and clavate exine respectively.

Among the extant pollen grains, *Pinjoriapollis* resembles with these of *Magnolia grandiflora* and *M. hamorii* except for the size. The length of *Pinjoriapollis* ranges between 120 to 170 μ while length of pollen of *Magnolia* spp. is up to 110 μ. It is therefore most likely that *Pinjoriapollis* may be related to some members of the family Magnoliaceae.

*Pinjoriapollis magnus* sp. nov.

Diagnosis.—Pollen grains oval-elliptical, 120–148 × 62–70 μ. Monosulcate, sulcus wide, extending from one end to the other, sulcus widening more towards one end. Exine 2.5–3.5 μ thick, laevigate, occasionally faintly intrapunctate (Figs. 1–2).

Holotype.—Fig. 1, size 148 × 62 μ; Regd. Slide No. 6196/5, Birbal Sahni Institute of Palaeobotany, Lucknow.

Type Horizon and Locality.—Pinjor Formation (Upper Siwalik), near Chandigarh, India.

*Pinjoriapollis lanceolatus* sp. nov.

Diagnosis.—Pollen grains lanceolate, 123–170 × 51–62 μ. Monosulcate, sulcus generally reaching from one end to the other, occasionally shorter. Exine upto 1.5 μ thick, laevigate (Fig. 3).

Holotype.—Fig. 3, size 170 × 62 μ; Regd. Slide No. 6193/9, Birbal Sahni Institute of Palaeobotany, Lucknow,



FIGS. 1-3. Figs. 1-2. *Pinjoriapollis magnus* sp. nov., Slide Nos. 6196/5 (Holotype), 6189/5. Fig. 3. *Pinjoriapollis lanceolatus* sp. nov., Slide No. 6193/9 (Holotype).

**Type Horizon and Locality.**—Pinjor Formation (Upper Siwalik) near Chandigarh, India.

**Remarks.**—*P. lanceolatus* sp. nov. differs from *P. magnus* sp. nov. in being lanceolate in shape and in having thinner exine.

*Pinjoriapollis* is an important constituent and is represented by 10% of the assemblage (*P. magnus* 4%; *P. lanceolatus* 6%). The pollen grains of this genus appear to have an affinity with those of the family Magnoliaceae. The present day distribution of this family is in temperate region. It has been noticed that the entire assemblage is composed of mixed elements both belonging to colder and tropical-subtropical climate. The source of the temperate elements towards the north and that of the tropical ones towards the south of the basin of deposition has already been suggested<sup>1-2</sup>. It may therefore be surmised that the source of *Pinjoriapollis* may lie towards the north.

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### GENETIC STUDY OF CLEISTOGAMY IN RICE (*ORYZA SATIVA* L.)

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IN a collection of tribal rice varieties studied at this Institute in 1971, a variety Dhundhuni was found to be cleistogamous. In this case, the glumes did not open at all, though fertilization and grain setting took place normally inside the florets. During anthesis, the glumes were firmly clasped and could be separated only with great effort. Both male and female organs developed satisfactorily. Pollen was healthy and viable and could be used in hybridisation. Such cleistogamy was reported by Kadam and Patil<sup>2</sup>. Chandraratna<sup>1</sup> and Parmar *et al.*<sup>3</sup> have stated that 'Sathi' varieties of Uttar Pradesh (India) also are cleistogamous. In their case, however, the panicle itself does not emerge from the boot-leaf sheath.

For genetic study of cleistogamy, reciprocal crosses of Dhundhuni with other varieties were tried. For obvious reasons, Dhundhuni flowers could be emasculated only by the clipping method. Seeds resulting from genuine crosses made in this way were shrivelled. On germinating 21 such seeds, the seedlings died within a week. On the other hand, Dhundhuni pollen used on 3 other varieties gave normal crossed seeds.  $F_1$  plants resulting from these crosses were only chasmogamous indicating that cleistogamy was of a recessive character.

With a view to determining the kind and the number of genes involved in its inheritance, 465  $F_2$  plants of the cross, Blue Belle  $\times$  Dhundhuni, were raised in 1972. As not a single segregate bore cleistogamous flowers and as the character could be a multiple recessive, a fresh round of crosses was undertaken with I.R. 8 and Chandina as the female parents. These provided additional 1104 and 714  $F_2$  plants respectively in 1980, but without producing a single cleistogamous one.

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