

# COMPARATIVE POLLEN MORPHOLOGY OF JAPANESE AND INDIAN SPECIMENS OF *SPINACIA OLERACEA* LINN

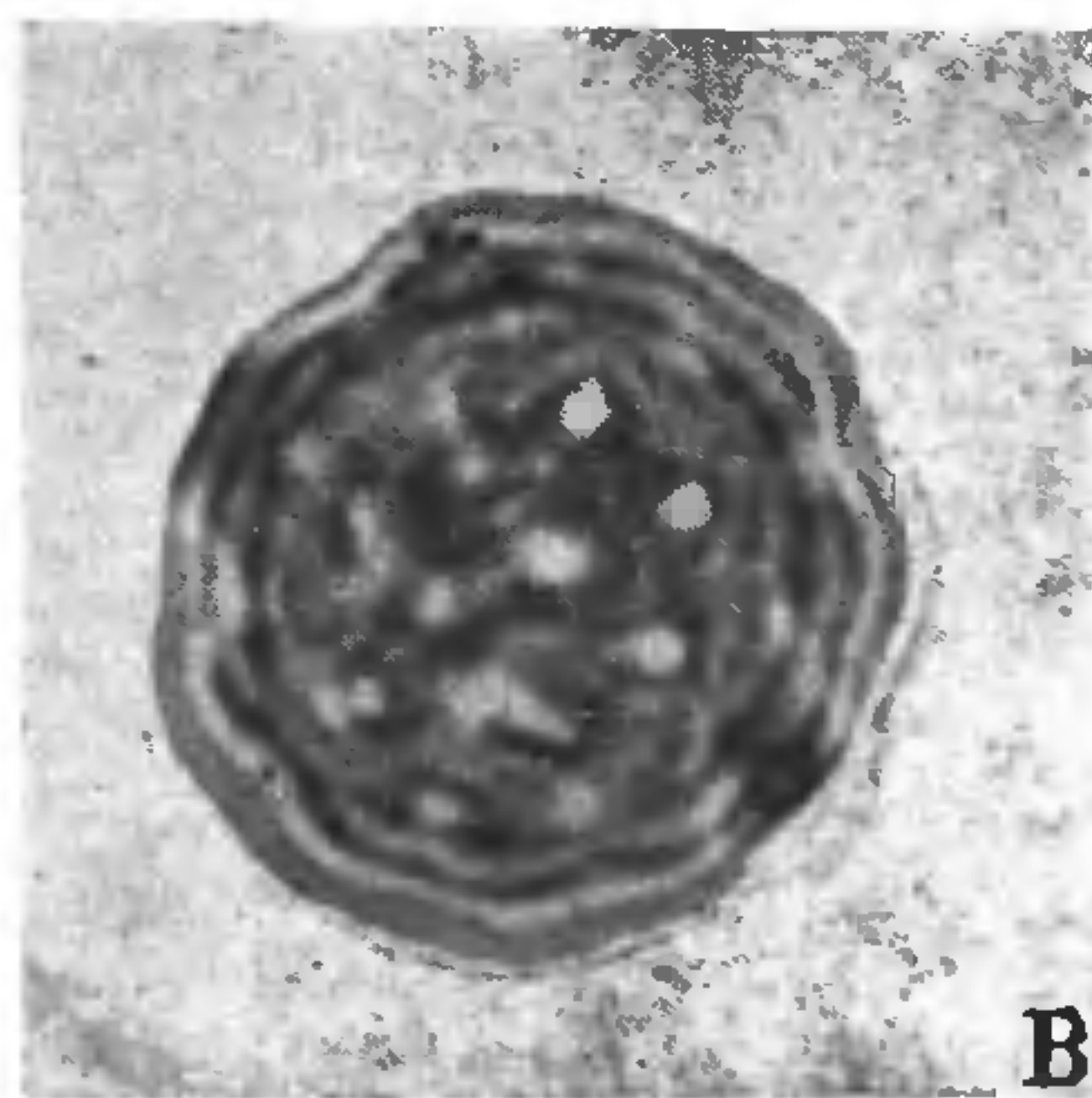
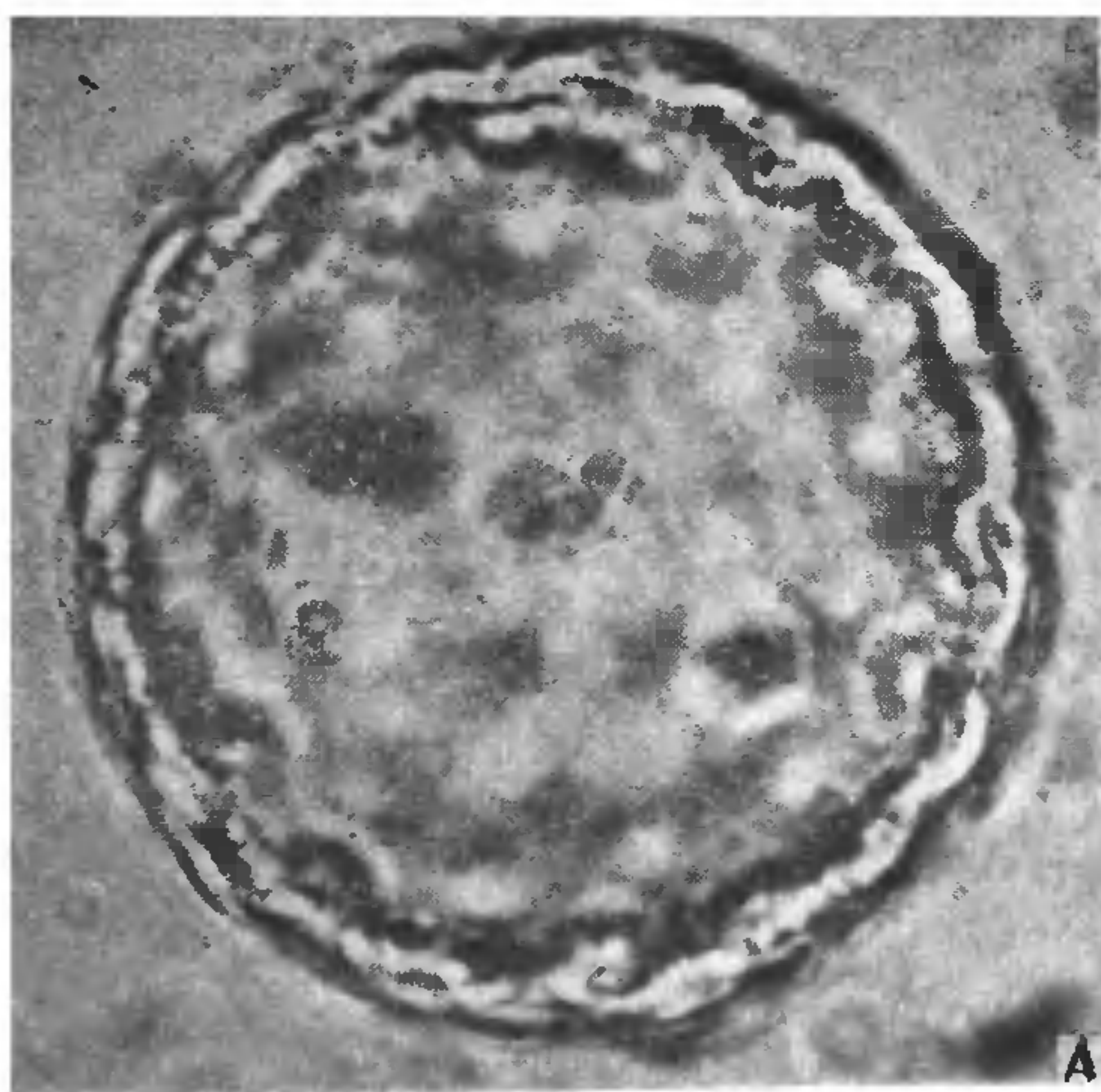
*Spinacea oleracea* Linn., belonging to the Chenopodiaceae, is cultivated throughout the world, for its leafy vegetable, but not subjected to such intensive breeding, as those of the major crop plants. All the same there is bound to occur certain adaptive changes in plants growing in various geographical zones, an instance of which is reflected in the pollen grains of the species from Japan and India.

The Japanese material for the study has been procured from the herbarium of the National Botanic Gardens, Lucknow, bearing the following details of collection: Acc. No. 102516; Loc. Tokyo, Prov. Musosi, Hando; Cult; Date of collection: 12-2-1961. The Indian material has been collected from plants growing at Lucknow. The pollen preparation for morphological studies was made by the acetolysis method<sup>1</sup>. The detailed morphology is as follows:

*Indian specimen* (Fig. 1, B).—Pollen grains stephanoporate; pore diameter  $1.5\mu$ ; interpore distance  $3.04\mu$ . Size  $12-24\mu$  ( $12\mu$ : 10%;  $16\mu$ : 15%;  $24\mu$ : 75%). Exine thickness  $1.52\mu$ , surface faintly granulose. Pollen production per flower: 50217.

From the above data on *Spinacia*, it is clear that there are conspicuous and distinguishable differences in the pollen morphology of the two specimens of the same species, from India and Japan respectively. The pollen grains of the Japanese specimen are characterised by pororate aperture and reticulate ornamentation in sharp contrast to the porate and granulate condition in the Indian specimen. In unipalynous taxa (*i.e.*, taxa whose pollen have the same basic morphology) in which pollen differences at all taxa levels are rather marginal, such sharp differences, as those in the two specimens of spinach reported here, are sizeable enough to distinguish two species.

Geographical isolation of taxa has been already shown to be reflected in pollen morphology<sup>2-3</sup>, and



FIGS. 1-2. Pollen grains of *Spinacia oleracea*. Magnification,  $\times 2,000$ .

A. Japanese specimen; B. Indian specimen.

*Japanese specimen* (Fig. 1, A).—Pollen grains stephanopororate (pore number more than 6), rather inversely pororate (*i.e.*, ectopore larger and endopore smaller); interpore distance  $4.56\mu$ . Shape spheroidal. Size  $32-56\mu$  ( $32\mu$ : 15%;  $44\mu$ : 75%;  $56\mu$ : 10%). Exine thickness  $1.32\mu$ , surface reticulate.

further, pollen variations as an index of geographical distribution have been demonstrated in *Argemone mexicana*<sup>4</sup> and *Caltha palustris*<sup>3</sup>, in the latter of which the pollen grains have been found to be pantoporate in the var. *alba* as against the three-colpate type in the var. *normalis*, and the present observation is further proof to suggest that



pollen morphology is an effective tool in varietal taxonomy. It is therefore suggested that in any consideration of taxonomic categorization of the spinach varieties, the Japanese and Indian specimens of the plant should be treated at least as distinct varieties and named accordingly, as *Spinacia oleracea* var. *japonica* and *S. oleracea* var. *indica* respectively.

National Botanic Gardens, P. K. K. NAIR.  
Lucknow, April 21, 1973. (Mrs.) S. K. KAPOOR.

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## SHORT SCIENTIFIC NOTES

### Discovery of Middle Palaeozoic Fossils from Southern Lahaul

The present note records the find of tabulate corals from the black calcareous splintery shales exposed 1.5 km from the Tandi bridge on the Chandra-Bhaga river in southern Lahaul. The fossiliferous rock has well-developed slaty cleavage and shining appearance. The shales are interbedded at places with bands of limestone, calcareous sandstone or quartzite and lie above the light green schists and quartzites. The occurrence of pebbly beds has also been noticed above the fossiliferous shales between Sisu and Tandi. This sequence had earlier been considered to be of Precambrian age<sup>1</sup>. The find of tabulate corals from the black splintery shales rules out the possibility of the entire sequence to be of Precambrian age. The coral specimens are poorly preserved with slender and polygonal corallites. The specimens belong to the family Favositidae<sup>2</sup> Dana, 1946 and may include representatives of the genus *Favosites* suggesting at least Middle Palaeozoic (Silurian or Devonian) age for the fossiliferous beds. The overlying Tandi Limestone has yielded Triassic conodonts. The authors believe that a major stratigraphic gap represented by a disconformity separates the black splintery shales from the Tandi Limestone.

### Hentriacontanol from *Cyperus iria*

Oil of *Cyperus rotundus* Linn. of Indian, Japanese and Chinese origin has been examined by three independent groups<sup>1-3</sup>. Sorm and co-workers reported the isolation of cyperine and a tricyclic sesquiterpene of unknown structure from the plant of Chinese origin. Nerali *et al.* while working on the *Cyperus scariosus* oil, which contains cyperene as a major constituent, reported the isolation of rotundene and rotundenol<sup>4</sup>.

Following these investigations presence of sesquiterpene ketones was expected from *Cyperus iria* which is used as a tonic, stimulant and astringent.

Shade-dried rhizomes of plant *Cyperus iria* were extracted with petroleum ether at room temperature. The major fraction, a solid colourless compound, was found to be a known aliphatic alcohol identified as hentriacontanol. (Hentriacontanol  $C_{31}H_{64}O$ , m.p. 81°–82° C; Acetate  $C_{33}H_{66}O_2$ , m.p. 74°–75°). It was confirmed by mixed m.p., spectral data and its acetate.

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