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LM AND SEM STUDIES ON SPERMODERM PATTERN IN SOME SPECIES OF *SESAMUM*

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Seed coat surface of the 6 species of *Sesamum* was studied using light and scanning electron microscopy. Seed coat varies from smooth to rugose.

Keywords : Light microscopy; Scanning electron microscopy; Seed coat, *Sesamum*.

Introduction

Seed surface studies are quite important in the identification of seeds. *Sesamum orientale* L. is an important oil seed and much attention has been paid to it; but its wild relatives have not received the same treatment. Collin and Perrot[1] reported the cultivation of *S. radiatum* in West Africa and its seeds are adulterant of *S. indicum* (= *S. orientale*). They described that the seed coat of *S. radiatum* has a finely rugose, radially wrinkled surface and the cells contain crystals. Kashi Ram[2] classified the seeds based on colour into pure white, various shades of brown, gray to black; as small, medium and large seeded based on size; and rough or smooth based on the surface texture of the seed coat.

Hiltebrandt[3] classified the seeds of *Sesamum orientale* as black, brown and white. Based on shape he recognised elongated and orbicular seeds. Recent SEM studies on the seed coat surface of different cultivars of *S. indicum* show variations in tuberculate pattern. There is gradual transition from tuberculate to non-tuberculate pattern among the cultivars which also vary in seed coat colour[4]. The present paper deals with the light microscopic and scanning electron microscopic studies on *S. orientale* and its wild relatives.

Materials and Methods

Seed of *Sesamum orientale, S. alatum, S. mulayamum, S. laciniatum, S. prostratum* and *S. radiatum* were procured from Tamil Nadu Agricultural University, Coimbatore. For light microscopy, seed coats of *S. orientale* were removed by soaking in water overnight and those of other species are by boiling in water for 10 minutes. The seed coats were placed in a solution of 10% sodium hydroxide, kept in an incubator at 60°C overnight, washed in water and finally stained with safranin and mounted in glycerine.

For scanning electron microscopic studies dry seeds were mounted on specimen stubs using Scotch double adhesive tape. Samples were coated with gold using Hitachi HU 85 GB-high vacuum evaporator to a thickness of 150°A. The coated samples were viewed in Hitachi model 8450 SEM operated at 5 KV

Observation

Light microscopic studies : In *Sesamum orientale* the cells of the seed coat are more or less hexagonal in outline with inconspicuous end walls. They are uniform and contain high amount of tannin (Fig. 1A). No ornamentations are seen.

The cells, however, are square in shape in *S. alatum* but the foldings form extreme thick ridges in a reticulate manner (Fig. 1B). In *S. mulayamum* and *S. laciniatum* the cells are hexagonal and thick-walled, in

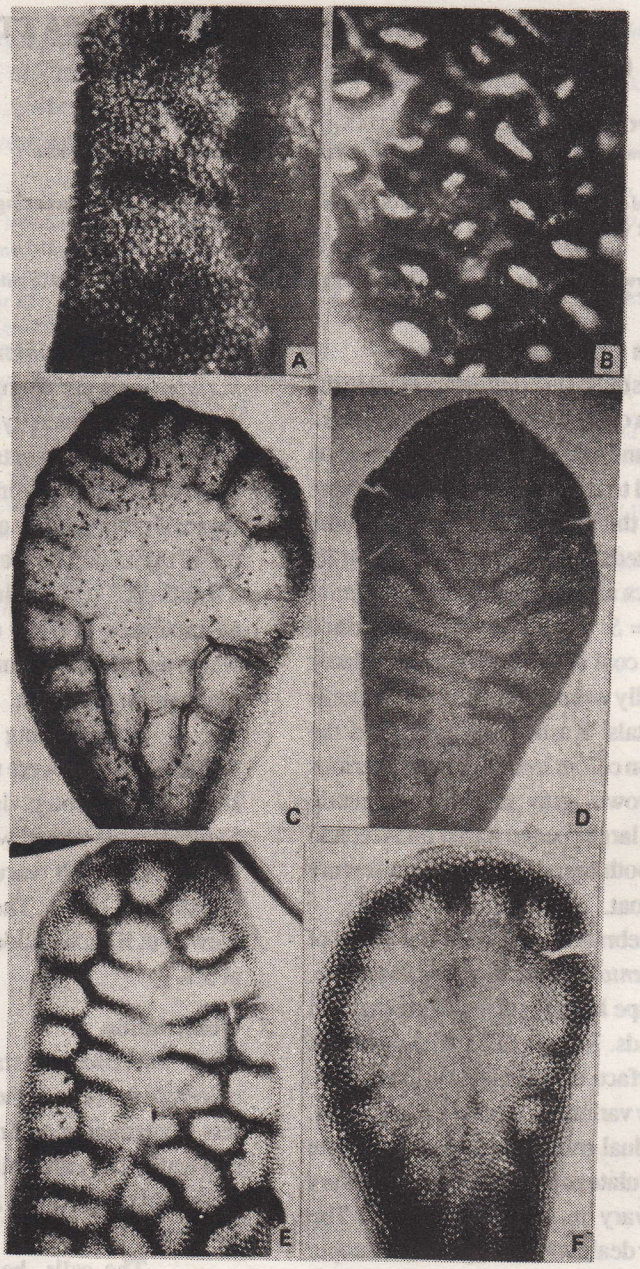

Fig. 1, A-F. Seed coat surface under light microscope
A. *S. orientale x 50;* B. *S. alatum* x 40;
C. *S. mulayamym x 40;* D. *S. laciniatum* x 40;
E. *S. prostratum x 40;* F. *S. radiatum* x 40;

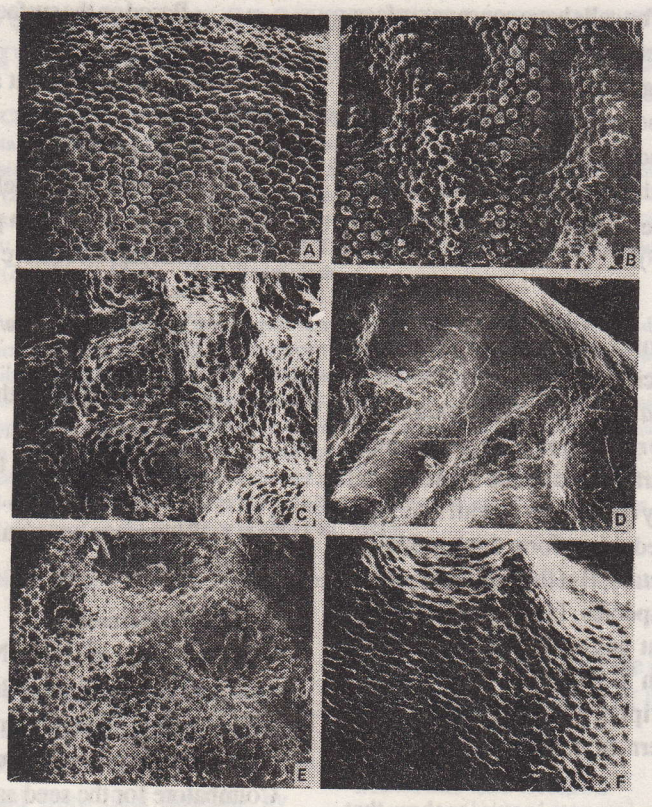

Fig. 2, A-F. Seed coat surface under scanning electron microscope
A. *S. orientale x 2000;* B. *S. alatum x 2000;* C. *S. mulayamum x 2000;* D. *S. laciniatum x 2000;* E. *S. prostratum x 2000;* F. *S. radiatum x 2000;*

the former the ridges form reticulate pattern all over the seed surface (Fig. 1C). While in the latter the ridges run across the longitudinal axis and are well pronounced along the periphery (Fig. 1D). In. *S. prostratum* the seed coat pattern is the same as in *S. laciniatum* but the ridges form uniform reticulate pattern (Fig. 1E). In *S. radiatum* though the cells are hexagonal and thick-walled, but the ridges radiate from the periphery towards the centre and are absent on the convex side; well pronounced ridges occur on the concave side (Fig. 1F).

Scanning electron microscopic studies :

Sesamum orientale : The cells are round with their smooth upper face convex. The end walls are not conspicuous. No ornamentations (Fig. 2A).

S. alatum : The cells have convex upper face. The end walls are not conspicuous. The thick ridges form deep pits on the surface (Fig. 2B).

S. mulayamum : The cells have concave surface with even, thick end walls. The ridges form shallow pits (Fig. 2C).

S. laciniatum : The cells have concave, smooth surface with inconspicuous end walls. The ridges appear wavy (Fig. 2D).

S. prostratum: The cells have concave surface with irregular end walls. The ridges form shallow pits (Fig. 2E).

S. radiatum: The cells have concave surface with uneven end walls. The ridges are not prominent and there are no pits. The surface is uniform in the middle and appears almost smooth (Fig. 2F).

Discussion

Smooth seeds of *S. orientale* stand unique among the species of *Sesamum*. The other species *S. alatum*, *S. mulayamum*, *S. laciniatum*, *S. prostratum*, *S. radiatum* have ridges on the surface and hence the seed coat is rugose. Heavy deposition of wall materials and well elevated ridges form thick reticulate pattern in *S. alatum*. But the ridges are not so thick in other species. In *S. laciniatum*, the ridges run right angles to the longitudinal axis whereas in *S. radiatum* they run only along the periphery. The ridges reveal reticulate pattern in *S. mulayamum* and *S. prostratum*.

Light microscopic studies show that the individual cells are isodiametric in all the species but reveal that they differ among themselves. SEM studies by Pandey & Dogra[4] on the surface of the seeds of *S. indicum* is reported to have tuberculate cells with globular protuberance which coincided with our present investigation where the individual cells have convex upper surface in *S. orientale* and *S. alatum*. But in all the remaining species the cells are concave. But end walls of *S. laciniatum* are inconspicuous. These characters are much useful in the identification of the species in *Sesamum*.

Based on the surface an identification key is given:

Seed coat smooth without any Ornamentation ..... *S. orientale*

Seed coat rough

Ridges are reticulate, cells have concave faces, ridges form deep pits..... *S. alatum*

Cells have concave faces ridges form shallow pits

Cells are smooth with irregular end walls ..... *S. prostratum*

Cells are thick with even end walls ..... *S. mulayamum*

Ridges run across the longitudinal axis of the seed ..... *S. laciniatum*

Ridges are seen only along the periphery ..... *S. radiatum*

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