PALYNOLOGY

Taxonomy was originally a descriptive science, and taxonomists arrived at conclusions on the basis of gross morphological characters. With the increase in knowledge of evidences from other disciplines such as Cytology, Ecology, Phytogeography, Anatomy, Physiology etc., it has been found that they have been useful and sometimes decisive in understanding phylegetic relationships of related or supposed to be related taxa. Palynology is also one of such branches which has been able to provide evidences that can be used taxonomically. The monumental work of Erdtman (1952) "Pollen morphology and plant taxonomy - Angiosperms" is a testimony of the importance of palynology in taxonomy.

In a taxonomic work on the Cruciferae of India, it was also thought reasonable to study the pollen morphology of as many members of the family as possible with a view to assess its importance within the family. Palynology of 71 species belonging to 30 genera is studied and the results are given in this chapter, as an adjunct to the published literature.

PREVIOUS LITERATURE

The pollen morphology of the family has been studied by Fritzsche (1832), Mohl (1834), Mendia (1939), Schacht (1859), Oetker (1888), Fischer (1890), Hansgirg (1897), Meinke (1927), Griebel (1930), Yamasaki (1933), Zander
Erdtman (1952) described the palynology of Cruciferae as follows:

*A Stenopalynous family. Pollen grains usually 3-colpate, (oblate spheroidal -) spheroidal subprolate (-perprolate); longest axis (15-) 20-30 (-45 μ); sometimes over 50 μ (cf. Selling I.C.) Sexine thicker than nexine, usually reticulate, simpli - (or dupli-) baculate. Dicolpate, 4-rugate, 6-rugate and irregular grains were occasionally found. The grains in Cardamine pratensis (Fischer I.C.) and Dringlea antiscorbutica are sometimes synocolpate.

Schizopetalum gayanum (Chile; Skottsberg 726) has monaperturate grains with three faintly indicated concavities instead of apertures. The pollengrains of Matthiola incana and M. tricuspidata are likewise monaperturate as already stated by Mohl. In Matthiola sinuata (Barcelona 1949) there are no, or only faintly indicated, colpi; in M. tristis (Aranjuez 1949) the apertures are replaced by elongate streaks with a weak and sparse reticulum. A similar state is, according to Fischer, met with in M. moderensis (cf. also Schacht I.C.).

Examples: Biscutella auriculata (Aranjuez 1949) - Fig. 73A. Grains 3-colpate, subprolate (39 x 33 μ). Heliophila ampelicnulns (S. Africa, Drege): 3 colpate (+ fosaaperturate),
Prolate (36 x 24 u); stray grains perprolate. Sexine thicker than nexine, probably tegillate (10-pattern). Colpi tenuimarginate. _P. monticola (S. Africa; Drige)_: subprolate (about 41 x 31 u). _Lepidium subulatum (Aranjuez 1949)_: subprolate (16.5 x 14 u). _Matthiola tricuspidata (Greece; Samuelsson and Zander S.r.)_: Fig. 72B. Grains nonaperturate, spheroidal (26 u). Sexine thicker than nexine, reticulate (muri simplibaculate).

_Fringlea antiscorbutica (Kerguelen; Kidder)_: 3-colpate (often 2-colpate (Syncolpate), or + irregular), subprolate (26 x 21 u). Sexine thicker at poles than at equator, reticulate (polybrochate; muri simplibaculate).

Putting a comment on the taxonomical significance of pollen grains of Cruciferae, he also concluded that "The pollen grains in Cruciferae are + similar to the grains in Capparidaceae, whereas they differ from those in Papaveraceae - Fumetiroideae*.

Nair (1965) in his book *Pollen grains of Western Himalayan plants* (pp. 12-13), has described the palynology of 15 species. _Arabis alpina Linn._: 3 Zonocolpate, subprolate (26 x 21 u). Exine 2 u thick, thinner towards colpi margins, reticulate, lumina being small; _A. arvensis _Haw.: Prolate (23 x 14 u); _Berberis vulgaris _R. Br._: Spheroidal (diameter 21 u); _Brassica campestris _Linn._: (Fl. III, Fig. 30): Spheroidal (diameter 35 u), rarely
prolate - spheroidal (35 x 32 u). Reticulations heterobrochate; B. juncea Coss.: Spheroidal (diameter 21 u); Capsella bursa-pastoris Medic.: Prolate (32 x 22 u); Cardamine hirsuta Linn.: (Pl. III, Fig. 31) : Prolate (32 x 22 u); C. impatiens Linn.: Prolate (21 x 14 u); Christolea crassifolia Castbess.: Subprolate (21 x 17.5 u); Draba alpina Linn.: Subprolate (31 x 25 u); D. elata Hook. f. & T.: Subprolate (26 x 22 u); Rucu sativa Mill.: Subprolate (28 x 24 u); Raphanus sativus Linn.: Subprolate (28 x 23 u); Sisymbrium wallichii Hook.: Prolate (22 x 15 u).

Matthiola incana R. Br. (Pl. III, Fig. 32):
Inaperturate (3 colpi - like apertures apparent in a few grains), Spheroidal (diam. 25 u). Exine 2.5 u thick, reticulate.

From the work of Nair (1965), it will be seen that he has accounted for the palynology of only 15 species belonging to 13 genera of the Cruciferae, and further that the palynological descriptions are rather meagre. This clearly shows that much work has to be done on this aspect for our Indian plants in order to assess its taxonomic significance. Therefore, a general survey of the pollen morphology of 75 species belonging to 40 genera was undertaken with a view to prepare a good palynological account and to realize if the information could be fruitfully utilized taxonomically.