SCANNING ELECTRON MICROSCOPIC STUDY ON POLLEN GRAINS OF *ORYZA SATIVA* L. VAR. JAYA

B. K. JAIN

Botany Department, Gujarat University, Navrangpura, Ahmedabad 380 014, India
Present address: Botany Department, Arts, Science and Commerce College, Shahada 425 409, India.

THE sculpturing patterns of pollen exine, the number and the position of germ pores are so characteristic that they usually permit the assignment of an individual grain to the family, often to the genus[1,2] and rarely even to the species and variety[3]. Such a study is important for separating several genera of the genus *Polygonum*[4].

The significance of pollen morphology in assessing the hybrid nature of *Oryza sativa* was earlier indicated[5,6]. Nair[7] studied the pollen of several varieties of *Sorghum vulgare* and *Zea mays* and showed the significance of size frequency curves in the taxonomy of those varieties.

Though pollen grains of many plants have earlier been studied scanning electron microscopically for their taxonomical value, they were confined to genera and species, and very little information is available at the variety level. The present SEM study was made on pollen grains of *Oryza sativa* L. variety Jaya and compared with the result of Maeda and Nakano[8] on pollen grains of the same genus and species but belonging to variety Indica.

The mature anthers of 15 plants of *Oryza sativa* L. variety Jaya were collected from the experimental field of Botanical Garden of the Gujarat University and dehydrated through upgrade ethanol series. The pollen grains were dried with CO_2 by the critical point method and mounted on aluminium stubs using double-sided Scotch adhesive tape. The stubs were coated with 200 Å thick Au-Pd film. Pollen grains were viewed and photographed in a scanning electron microscope (Cambridge Stereoscan 54–10).

The pollen revealed a reticulate exine consisting of irregular lumina throughout (figures 1 and 2). It was studded with minute granules, hence granulose (figures 2 and 3). The pollen was monoporate and the pore was provided with an annulus surrounding it and an operculum overhanging it (figures 2 and 3).

SEM studies of Maeda and Nakano[8] on the pollen grains of the same genus and species but belonging to variety Indica revealed anomalous grains having two germ pores. The exine did not show depression or lumina, hence it was not reticulate, but developed

Figures 1–3. SEM photographs of pollen grains of *Oryza sativa* L. **1.** Single pollen showing reticulate exine. Note irregular lumina on exine (×1647). **2.** Magnified germ pore provided with an annulus surrounding and operculum (×4118). **3.** Magnified surface of pollen showing germ pore. Note the entire surface is studded with minute granules (×8235) (OPE = operculum; ANN = annulus).

many discrete granules and the structure composed of 2–4 granules on the surface.

Morphological observations on the different varieties i.e. Jaya (present investigation) and Indica[8] of *Oryza sativa* L. indicate a differential pattern of exine formation. These results strengthen the view of Erdtman[3] that the study of pollen morphology may not only be useful in recognizing the different species of a genus but also the variety to which pollen grains belong.

The author is grateful to Prof. C. K. Shah for encouragement and guidance.

23 December 1986; Revised 28 July 1987

1. Muller, J., *Biol. Rev.*, 1970, **45,** 417.
2. Nowicke, J. W. and Skvarla, J. J., *Ann. Miss. Bot. Gard.*, 1979, **66,** 633.
3. Erdtman, G., *Pollen morphology and plant taxonomy—angiosperm*, Almqist and Wiksell, Stockholm, 1952.
4. Hedberq, O., *Svensk. Bot. Tidskr.*, 1946, **40,** 371.
5. Sampath, S. and Ramanathan, K. J., *Indian Bot. Soc.*, 1951, **30,** 40.
6. Misro, B. and Rath, C. C., *J. Bot. Soc. (Bombay)*, 1961, **4,** 36.
7. Nair, P. K. K., *Indian J. Agric. Sci.*, 1962, **32,** 196.
8. Maeda Eizo, and Nakano Hiroshi, *Jpn. J. Crop. Sci.*, 1979, **48,** 490.

TERATOLOGICAL OBSERVATIONS IN TWO SPECIES OF *CORCHORUS* L. (TILIACEAE) FROM MARATHWADA

V. N. NAIK and S. P. ROTHE
Department of Botany, Marathwada University, Aurangabad 431 004, India.

DURING our investigations on the flora of Marathwada some interesting specimens of flowering plants were collected from Beed District. During this collection, a few unusual specimens of *Corchorus fascicularis* Lamk were noted from the banks of Pangri river. They were therefore collected in large numbers and preserved for future investigation. Such unusual specimens were also collected from the population of *Corchorus velutinus* Pardeshi from Choramba.

The curious specimens of both the species are undershrubs and have vegetative characters quite similar to their normal specimens. However, the flowers exhibited a series of abnormal features from short-stalked normal flowers to flowers with elongated peduncles and pedicels, enlarged leaf-like calyces, green foliar petals, stamens partly or wholly transformed into green leaves, carpels completely transformed into green-folded leaves simulating conduplicate carpels and total absence of ovules. Some flowers were partly transformed while others were completely transformed into short vegetative branches (figures 1A and B).

The normal flowers of the above species of *Corchorus* are borne on very short axillary peduncles and pedicels. In *C. fascicularis* they are in clusters of 3 to 4 and in *C. velutinus* they are in pairs. Both are pentamerous with indefinite (usually 15–20) stamens and 3 to 4 carpels and 3–6 mm long. But in the abnormal specimens these were replaced by 2–10 cm long or longer branches with extended internodes and 4 whorls of 4 leaves each (figures 1 Aa-Ae and Bb). Leaves on these branches were much smaller than the normal foliage.

A review of literature on plant teratology and diseases indicates that such abnormalities have been reported in a large number of cultivated and wild plants in the past. The 'false blossom disease' of cranberry[1,2] and 'Witches broom virus disease' of *Tropaeolum majus*[3], for instance, are of particular interest in the present context.

A series of abnormalities progressing from a normal flower to completely vegetative leafy branch in *Tropaeolum majus* and other plants have been termed *antholysis*[3] which entails *virescence* (greening of floral parts), *phyllody* (development of floral parts into normal foliage), *apostasis* (the development of the internodes theoretically present in the floral receptacle) and prolification (elongation of receptacle above the insertion of the pistil).

Although the last stage of antholysis, namely prolification, has not been observed in the present species of *Corchorus*, the situation appears quite similar to that in the false blossom disease of cranberry[4] and witches broom virus disease of *Tropaeolum majus* mentioned above. Similar abnormalities in plants due to diseases reported earlier from tropical countries include phyllody of *Crotalaria juncea*[5], phyllody of *Sesamum indicum*[6], green petal of strawberry and invirescence of *Emilia sonchifolia*[8]. All these diseases were ascribed to a virus up to 1967 but now most of these are ascribed to mycoplasma-like organisms[9].