

3. Acetolysis: a positive test for the identification of normal and aborted pollen grains in grasses.

The importance of recognition of normal and aborted pollen grains in maize and other cereal crops is well known to plant breeders. Various staining procedures are used, such as cotton blue in lacto-phenol, acetocarmine, various tetrazolium salts, iodine and potassium iodide in dilute alcohol. But most of these stains are either nuclear or protoplast dyes and often show fading when permanent mounts are made.

We have used the standard acetolysis technique following Erdtman (Sv. Bot. Tidskr., Vol. 54(4): 561 - 564; 1960), except we have increased the timing to 5 - 6 min. to give a differential staining of the pollen grain exine.

Permanent slides are made by mounting the acetolysed pollen grains in standard glycerine jelly, and the exine color is stable.

The normal pollen grains stain a dark-brown color, while the exine of aborted pollen grains is lighter and shows a pale yellow color. In addition, in glycerine jelly mounts the large majority of the aborted pollen grains collapse, and we consider this difference as a distinct character of the aborted pollen grain exine.

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4. Similarity of the ektexine pattern of normal and aborted pollen grains in maize and other grasses.

In an earlier study with the pollen grains of maize, Tsukada and Rowley (1964) postulated that the density of the spinules of the ektexine (outer sculptured layer of the exine) was different in normal and aborted (sterile) pollen grains, when spinules were counted per unit area. The spinule density in aborted pollen grains was always higher in comparison to the spinules of normal pollen grains.

Our observations, using an electron microscope, show that there is no such difference present among grasses when normal and aborted pollen grains are obtained from genetically similar lines. The only obvious difference we have noticed is that the pollen grains exhibit differential stainability when subjected to a prolonged acetolysis treatment. The