

METALLURGICAL MICROSCOPY IN PLANT MICROMORPHOLOGY

MEHMET AYBEKE

*Department of Biology, Faculty of Arts and Sciences,
University of Trakya, Edirne, 22030, Turkey*
E-mail: maybeke@hotmail.com; mehmetaybeke@yahoo.com

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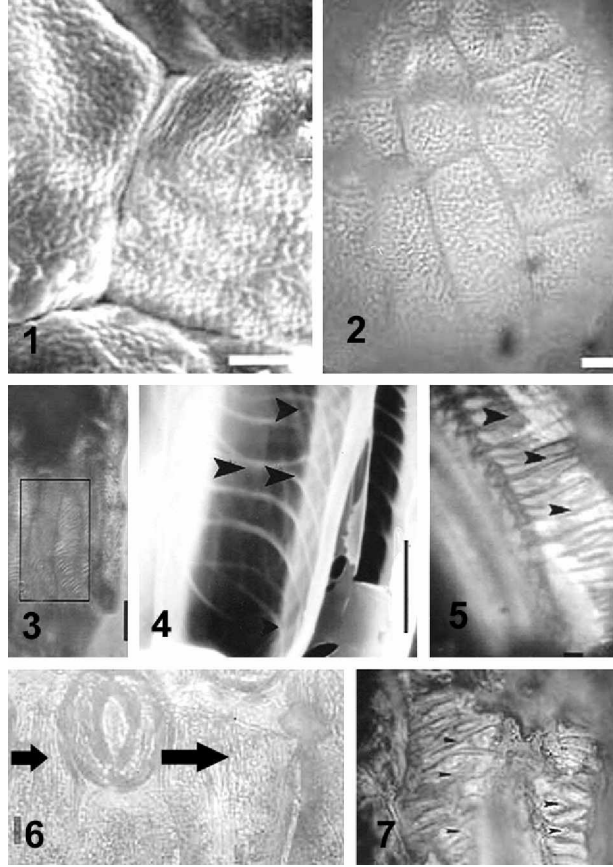
Abstract

The aim of present study was to use metallurgical microscope in pollen and seed micromorphology and compare the outcome with that of Scanning Electron Microscope technique. Results show that Metallurgical microscope with polarizing filter is a very useful instrument for non-translucent, flat and large surfaces, at $\times 1000$ - 1300 magnifications. This type of microscopy is user friendly and economical than that of SEM.

In botanical researches, surface morphology has been mostly investigated by Scanning Electron Microscope (SEM) which yields very detailed aspect of plant parts. This technique is both expensive and necessitates additional laboratory equipments and personal help. However, object can be directly investigated under Metallurgical Microscope (MM) without any pretreatment. In addition, the MM is capable of producing a magnified image of a small particle, and has been so far used for mostly metallurgical purposes including metals, ceramics, minerals etc. (Romînu *et al.* 2002). Even if magnification of MM is not so much as SEM, nevertheless very striking results can be obtained from MM technique in morphological work. Therefore, the aim of the present study was to compare these two techniques at low magnifications, and then to emphasize usefulness of MM technique for plant morphology studies.

As investigation material, pollinium (pollen masses), seeds and leaves of *Ophrys mammosa* Desf. (Orchidaceae) were used. For SEM preparations, specimens (pollen, seed) were mounted on double-sided cellophane tape on aluminium stubs and, coated with gold-palladium (Ackerman and Williams 1981, Aybeke 1997). Observations and photography were carried out with a JEOL JSMT-330 Scanning Electron Microscope. As MM technique, MEIJI ML 8530 with polarizing filter, was used. Photographs were taken with Olympus C-5060 Wide zoom digital camera and were arranged by using Olympus Camedia Master 4.10 software.

Results obtained show that MM technique can be productively used in morphological studies, such as pollen, seed and leaves (Figs. 1-7), on condition that surface is to be flat, large and non-translucent. During pollen observation under MM microscope, it is necessary to illuminate the specimen from various angles, to reduce light intensity by manipulating aperture diaphragm, and then to take photograph. Use of polarizing filter and incident illumination effect causing light passing down through the objectives onto the surface of the specimen, increase image quality with this technique, at low magnifications such as $\times 1000$ - 1200 . Consequently the MM photography technique will undoubtedly bring to one's knowledge more information than were known before.



Figs. 1-7: Metallurgical microscopy in pollen grains. 1. Pollen surface using Scanning Electron Microscope. 2. Pollen surface using MM. 3. General view of a seed observed under light microscope. 4. Some cells of seeds under SEM. 5-6. Some cells of seeds under MM (arrowheads indicate reticulations on testa). 7. Leaf surface in MM.

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