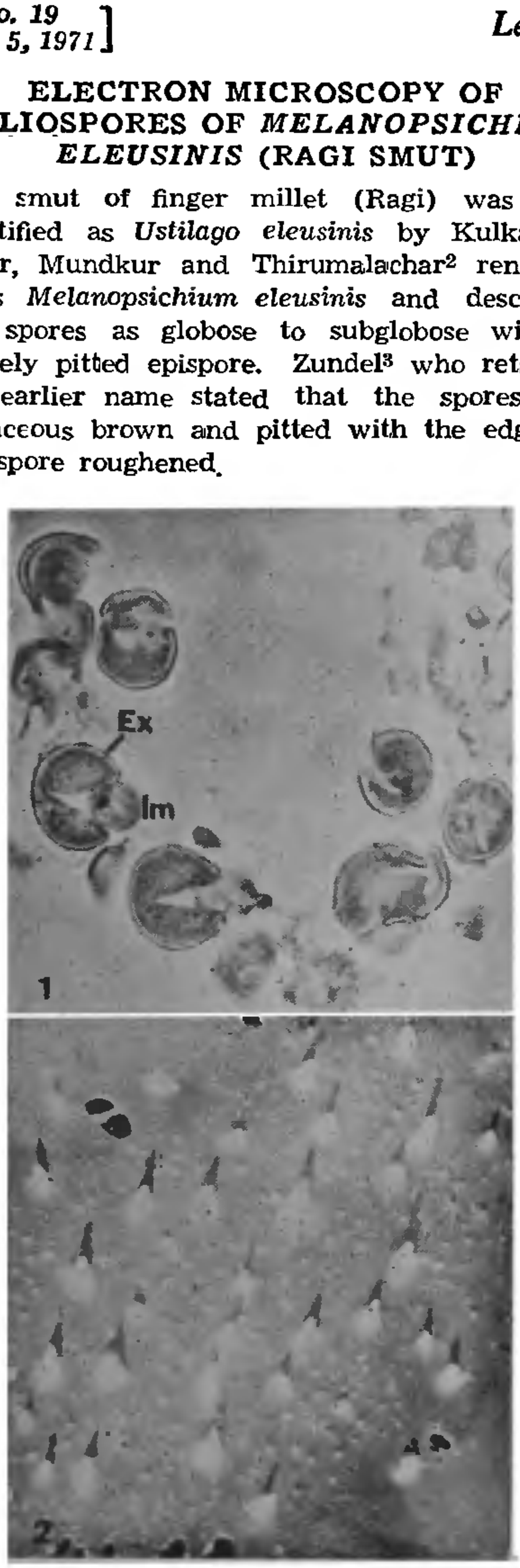
ELECTRON MICROSCOPY OF TELIOSPORES OF *MELANOPSICHIUM ELEUSINIS* (RAGI SMUT)

THE smut of finger millet (Ragi) was first identified as *Ustilago eleusinis* by Kulkarni[1]. Later, Mundkur and Thirumalachar[2] renamed it as *Melanopsichium eleusinis* and described the spores as globose to subglobose with a densely pitted epispore. Zundel[3] who retained the earlier name stated that the spores are olivaceous brown and pitted with the edge of the spore roughened.



FIGS. 1–2. Fig. 1. Showing ruptured teliospores with exosporium (Ex) and released inner mass (Im), × 670. Fig. 2. Electron micrograph of spore replica showing large-sized conical pointed spines and minute papillate outgrowths, × 12,500.

Spore material of *M. eleusinis* on *Eleusine coracana* Gaertn. was obtained from Agricultural University, Bangalore, through the courtesy of Dr. H. R. R. Reddy during 1963.

For optical microscopic studies, the spores were processed in accordance with the method of Graham[4]. By this method it is easy to separate the spore wall layers.

Spore replicas for electron microscopy were prepared by adopting gum-formvar technique (Hess and Schantz[5], Khanna, *et al.*[6]). In the light microscope, spores are spherical to subspherical and dark brown (Fig. 1). They measure 8·0–12·0 μ with an average of 10·5 μ in diameter. The outer layer or the exosporium is highly pigmented and bears projections. The spores on rupture release the inner contents including the protoplast. The released inner mass is spherical to subspherical, hyaline and measures 6·4–9·0 μ (Mean, 8·0 μ) in diameter.

Figure 2 shows surface replica of a part of spore on gum-formvar. The surface is densely echinulate and shows two types of outgrowths. The large-sized conical projections are sharply pointed. They measure 150 $\pm$ 25 nm in height and are 180 $\pm$ 26 nm broad at the base. In addition, numerous small outgrowths designated as 'spinulae' or 'papillae' are also present. These are 20 $\pm$ 5 nm in height and 35 $\pm$ 5 nm broad at the base.

An important and interesting feature of the spores studied here is the occurrence of sub-microscopic 'spinulae' which are small papilliate outgrowths interspersed among the regular large sized projections on the exosporium. The presence of two kinds of projections has also been observed in teliospores of *Sphacelotheca reiliana* (Khanna and Payak, Unpublished). This study has shown that the spores in *Melanopsichium eleusinis* are echinulate and not pitted as shown by earlier workers.

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1. Kulkarni, G. S., *Ann. Appl. Biol.*, 1922, 9, 184.
2. Mundkur, B. B. and Thirumalachar, M. J., *Mycological Paper No. 16*, 1946.
3. Zundel, G. L., *The Ustilaginales of the World*, Pennsylvania State University, 1953, 11, 410.
4. Graham, S. O., *Mycologia*, 1960, 52, 97.
5. Hess, G. E. and Schantz, E. J., *Science*, 1956, 123, 983.
6. Khanna, A., Payak, M. M. and Mehta, S. C., *Mycologia*, 1966, 68, 562.