segregation in these tetraploid "species" for the morphological characters that distinguish the diploid parents. It is the hybrid origin of these populations that makes them so variable.

Even though the names T. pilosum and T. lanceolatum may be used for the purposes of classifying a given specimen, in view of the presence of a wide range of morphological characters and the small D value between the so called T. pilosum and T. lanceolatum it seems better to regard the whole group of tetraploids as a T. lanceolatum complex which includes a wide range of morphological forms.

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1. Electron microscopy of the chlamydospores of corn smut (Ustilago maydis (DC.) Corda).*

This report is based on our preliminary observations with carbon replicas of the chlamydospores of corn smut at the ultrastructural level. The replication method employed here is a methyl-methacrylate heat-pressure technique. The technique has been slightly improved by us in order to use this method in fungal palynology.

The chlamydospores suspended in water are evenly spread on the flat surface of a prepolymerized, methacrylate plastic plate (about 15 by 20 mm in size). The preparations are then allowed to air-dry overnight in a clean chamber. Further the plate, with a thin layer of dried spores, is sandwiched between glass plates, held tightly with clamps and heated to about 105 degrees C for ca. 15 to 20 minutes. After cooling to room

*This work was partly done at the Biology Department, Yale University, New Haven, Conn.

temperature the spore debris is removed mechanically, and spore impressions are then shadowed with 150 Å thick carbon and chromium. The carbon-chromium replica is then scored into small pieces with a sharp razor blade and suspended in a mixture of benzene and chloroform (1:1 by volume) to remove the plastic. Individual pieces of the replicas are then placed on 250 mesh copper grids for viewing. The electron microscopes Hitachi HS-7S and RCA EMU-3D are used for photography.

Under the electron microscope the spore shape appears spherical, the size varies from 7 - 12 u, and the spores are covered with sparsely situated prominent spines (echinate). Occasionally some spines are slightly curved at the tips. Each spine is covered all over with very fine micro-spinules; in side view the spines appear finely serrated. At the base of each spine, the micro-spinules are found in rings. The spore membrane between the spines is smooth to slightly granular. We consider that the use of such micro-characters may be helpful in identification of various genetic races of corn smut, which so far has not been possible with the conventional light microscope.

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2. Electron microscopy of the pollen grains of maize, teosinte, and Tripsacum.

Precise identification of the pollen grains of maize, teosinte, and Tripsacum has great potential in tracing the past agricultural activities in the New World. Several distinguishing characters such as pollen grain size, pore-axis ratio, exine pattern, and spinule density per unit area were studied previously in this laboratory with conventional light and phase-contrast light microscopy (Barghoorn et al., 1954; Irwin and Barghoorn, 1962, 1965; and Bartlett et al., 1969).

The present report provides further observations on the ektexine (outer sculptured layer of exine) pattern at the ultrastructural level, using the scanning electron microscope (SEM) and the transmission electron microscope (TEM). The pollen grain samples of these genera

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