BOSTON COLLEGE
Chestnut Hill, Massachusetts
Department of Biology

1. Additional studies of the microsporocytes of Chalco (Mexico) teosintes.

Microsporocytes of five more Chalco teosintes were studied with the light microscope. Slides were prepared by following the standard aceto-carmine squash technique. These teosintes were grown from open-pollinated seeds. It was observed that the pachytene chromosomes were generally well spread. Individual chromosomes, as well as their knobs and other gross characteristics, could be readily identified. A total of eight knobs was found. All knobs were homozygous, except for the terminal knob on the short arm of chromosome 9. A small internal knob was present on the long arm of chromosome 1, medium-sized internal knobs were found on the long arms of chromosomes 2, 3, 4 and 6 and large internal knobs were observed on the long arms of chromosomes 7 and 8. Chromosomes 5 and 10 were knobless.

These teosintes differ from the Chalco teosintes previously studied by the author (1964) in having five fewer knobs. The internal knob positions on the long arms of chromosomes 2, 4, 5 and the first knob position on the long arm of chromosome 6 were not occupied in these teosintes. The small terminal knob on the short arm of chromosome 4 and the second type of chromosome 10 were not found.

Even though several hundred sporocytes were carefully examined, no In8 or any other structural alteration were observed. This finding is believed to confirm the report by the author (1964) that In8 is homozygous in Chalco teosintes. Homozygous inversions do not form any visibly abnormal configurations at the pachytene stage.

At diakinesis, 32% of 164 sporocytes studied were found to have nine bivalents and two univalents; 65%, 10 bivalents; 3%, eight bivalents and four univalents. The two univalents present in the first class of sporocytes are probably homologues of chromosome 9. The heterozygous terminal knob of this chromosome might interfere with chiasma formation.

Microsporocytes from two of the above teosintes were also examined with the electron microscope following the standard sectioning and staining procedures. A synaptonemal complex was consistently observed at the

pachytene stage. The three components of this complex, two lateral elements and one central element, were well differentiated. No complex was found to be attached to the nuclear envelope. The average diameter of the complex was 2200 Å. Both knobs and centromeres of the different chromosomes could also be recognized.

In addition to the normal nucleolus, one to several nucleolar bodies were frequently present. One of the nucleolar bodies was found to have several vacuoles arranged in an orderly form. Details of these studies will be reported later.

Y. C. Ting

2. Fine structure of the nucleolus of a diploid maize.

Under the light microscope a cup-shaped structure could be identified at the pachytene stage in the nucleolar organizer region of the microsporocytes of a diploid inbred maize (Strain A158). This structure persisted through diakinesis, even though its shape and size might vary somewhat. In addition, nucleolar bodies, ranging from one to four, were also frequently found. Their diameter was, on the average, five microns. With standard procedures of electron microscopy, the cup-shaped region of the nucleolus was seen to be comprised of fibers in a spiral arrangement. These fibers measured approximately 400 Å in diameter. They were as darkly stained as the rest of the nucleolus throughout the prophase of meiosis. No membrane-like structure enclosing either the nucleolus or the nucleolar bodies was observed. However, both organelles consistently showed a vacuole or vacuoles in the middle region. The vacuoles appeared to be free from any inclusions.

Y. C. Ting

3. Preliminary studies of normal and male sterile cytoplasm in maize.

Root tips from WF9T male sterile maize and its maintainer (WF9) were prepared for electron microscopic observation. Inclusions were not usually present in male sterile cells, although some inclusions were noticed in the cells of the future vascular cylinder. These inclusions, which have not been seen in the maintainer cells, appear to be membrane-bound and often contained three or four dark staining granules. The