Phenotypically the F_1 plants were very similar to the teosinte parent when they were grown in the field, particularly with respect to the characteristics of fruits and flowers. When these F_1 hybrids were grown in the greenhouse it was even more difficult to distinguish their growth habit from that of the inbred perennial teosinte.

The microsporocytes of these F_1 hybrids are currently under study with the electron microscope to see if there is any difference in the structural organization of the synaptonemal complexes between the homologously associated chromosomes and the nonhomologously associated ones.

In order to facilitate backcrossing the F_1 hybrids to the parental species, clones of these hybrids were subjected to colchicine treatments. It appears hopeful that some of these plants will become hexaploid subsequent to these treatments, because they have thick leaves and slow growth.

Y. C. Ting

The fine structure of the bivalent chromosome 6 of Chalco-teosinte — A brief report on the gross structure of the nucleolus and nucleolar bodies of Chalco-teosinte was given last year (M.G.C.N.L. 48:17). Further studies with the electron microscope were carried out on these organelles and on the bivalent chromosome 6 (nucleolar chromosome). It was consistently found that there were nucleolar bodies, varying in size and number from cell to cell, in addition to the regular nucleolus. These bodies were always without a nucleolar cup and unattached to any chromosomes. No fiber-like structures were seen in them; however, granular substances embedded in the homogeneous matrix were always present. In contrast, fibers of 300-400 Å width in the form of a helical arrangement were present in the cup-like structure of the regular nucleolus. These are probably the nucleolonema. Connections between these fibers and the chromatin region of chromosome 6 were also observed. These connections appeared to consist of fine fibrils having an average width of 100 Å. Both the nucleolar bodies and the regular nucleolus possessed vacuoles, which also varied in number and size but were invariably spherical in shape.

At pachynema, the central element of the synaptonemal complex of bivalent chromosome 6 measured about 300 Å in width, which is less than that of diploid and haploid maize and Michoana-teosinte. It was also frequently found that the central element was composed of two components, each with a cross dimension of 100 Å. In the centromere region, fibers with a cross dimension of 300 Å were sometimes observed connecting the densely stained chromatin regions of the two arms. In addition the centromere region possessed a less darkly stained area flanking the fibers and extending into the nucleoplasm.

Up to the present no synaptonemal complex has been definitely identified in the

satellite segment of chromosome 6. Only darkly stained chromatin, sometimes divided by a clear region, was found in this segment.

Y. C. Ting

Effect of streptomycin on chloroplast structure and pollen fertility —The attempt to induce cytoplasmic male sterility in maize using streptomycin has been continued from last year. C103N seed was treated in 50 ml solutions of streptomycin (Petrov, Fokina and Zheleznova, U.S. Patent #3,594,152) for 24 hours at room temperature with dosages ranging from .0005 micrograms/milliliter to 10,000 micrograms/milliliter. At the same time, control seeds were soaked in distilled water.

At a dose of 50 ug/ml, bleaching of the leaves was noticed, and none of the plants which had been treated with at least 500 ug/ml survived past the seedling stage. However, the most profound effect on the surviving plants occurred at .001 ug/ml, with one of these plants exhibiting altered morphological characteristics. This plant was much shorter than the control plants, and it produced only one central spike.

The unshed pollen of all the plants was checked, using the conventional aceto-carmine staining, in order to ascertain if there had been any effect on pollen fertility. All the control and treated plants with the exception of the one abnormal plant had fertile pollen. When the unshed pollen from this plant was checked it was found that the anthers from the top two-thirds of the spike contained mostly fertile pollen; the anthers from the lower one-third of the spike contained all sterile pollen. Thus, this plant was sectorially sterile.

Chloroplasts of the treated plants were studied in leaf sections prepared for electron microscope observation. This was done in an attempt to correlate pollen sterility with a change in the chloroplasts. The leaf sections from the sectorially sterile plant showed normal sized chloroplasts with a much higher number of osmiophilic granules. As the dose of streptomycin was increased to 50 ug/ml, the chloroplasts appeared shrunken and no longer had the characteristic grana. At a dose of 500 ug/ml the whole lamellar structure had disintegrated, and the chloroplasts were greatly reduced in size.

It is encouraging that at least partial sterility can be induced by streptomycin. Further studies are being done using this drug, and more examinations of chloroplast structure in both maintainer and cytoplasmic male sterile plants are being conducted. Hopefully, these studies will yield new information on the possibility of involvement of the chloroplasts and the other organelles in the phenomenon of cytoplasmic male sterility.

Rita M. Ryan