and other maize relatives have yet to be investigated, the above data support the hypothesis that maize is domesticated teosinte.

This work was begun at the Genetics Department, University of Missouri, Columbia, Missouri, U.S.A.

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2. Leaf phenolics of Zea mays, Zea mexicana and Tripsacum species.

A project is underway to investigate leaf phenolic constituents of primitive races of *Zea mays*, geographically diverse collections of *Zea mexicana* and several biotypes of each species of *Tripsacum*.

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3. New chromosome techniques for knob detection in mitotic chromosomes in maize and teosinte.

Recent advances in cytological techniques have made possible the linear differentiation of mitotic chromosomes in many plant and animal species (Caspersson et al. 1969; Vosa, 1970, 1971; Pardue and Gall, 1970; Arrighi and Hsu 1971).

There are now two new main cytological methods; one exploits the differential DNA binding specificity of certain fluorochromes of the acridine group and the other the property of the Giemsa stain to differentiate, after various kinds of denaturation and reannealing, between repetitive and less repetitive DNA sequences in the chromosomes. The exact biochemical implications of both methods are not fully known at present.

The present note relates to a series of experiments carried out with both methods on the chromosomes of some varieties of Zea mays and Zea mexicana.

Fluorochrome method

The technique used has been that suggested by Vosa involving the use of quinacrine dihydrochloride and quinacrine mustard as well as ethidium bromide. The results showed that in maize and teosinte there are no highly fluorescent bands or bands of reduced fluorescence and that in both species the chromosomes show uniform fluorescence along their length. The chromocentres, when present, are visible and show normal fluorescence.

Giemsa method

Several techniques were tried with variable results. The more consistent was a modification of the technique suggested by Summer et al. (1971) using barium hydroxide as denaturing agent and a saline buffer (SSC) for reannealing (Vosa and Marchi, 1972). The results show dark staining bands in several positions in the chromosomes of maize and teosinte. In maize these bands seem to correspond in number and location to the knobs.

Good agreement in band and knob position was found in two varieties of maize from Brazil. The teosinte varieties used were from Guatemala, Mexico and Honduras.

The Giemsa technique as outlined above should prove itself to be an important tool in the study of knob polymorphism in maize and teosinte.

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1. The use of linear regression graphs in the determination and prediction of yield behavior in maize.

Since the development of this method by Robbertse (unpublished D.Sc. (Agric.) thesis, University of Pretoria, 1969 and MNL 44:180), it has been extensively studied and used in practice. The results to date show it to be appreciably more useful in breeding and cultivar choice than any other known statistical determination.

Due to the very high genotype-environment interaction in maize in Southern Africa, single trial averages are extremely unstable and relatively useless. Global averages over a large number of trials, although more stable, have little predictive value for the varying conditions under which any maize cultivar will be grown. As Robbertse showed, grouping of trials in order to reduce genotype-environment interaction is so unstable over years, that its value is highly suspect.

These conclusions were strongly supported by the work of Wickens (unpublished D.Sc. (Agric.) thesis, University of Pretoria, 1971) on double hybrid predictions, using the above statistics as well as regression graphs.

The results of Robbertse and of later workers have shown that the regression of specific cultivar yields on average trial yields is highly linear with R^2 values in the region of 90%. Only with very large numbers of trials ($\pm$100) do some cultivars give a significant although very slight curvature. Furthermore, when using the average of