

March 27, 1972

Ing. T. Angel Kato Y.  
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Dear Kato:

Your letter and enclosure of March 16 was received. I delayed commenting on material you sent to me earlier as I recognized that adequate comments would require an extensive literature search on my part. Conclusions that may be drawn from knob data should be compared with those drawn from other studies. The knob data clearly reveal degrees of relationship of strains of maize. In some instances it is necessary to relate our explanatory accounts of relationships with those based on well authenticated anthropological and historical studies. This is in order to avoid unnecessary conflicts. As an example, potential conflict could arise from conjectures based solely on knob studies of the maize of Indian tribes in Oklahoma. The history of these tribes both before and after the arrival of the Europeans will show why this is so.

During the past century, Indian tribes from the north, the east, and the southeast sections of the U.S. were pushed into Oklahoma by the white man. When I was a child going to school, Arizona, New Mexico, and Oklahoma were not states. They were called "Indian Territories." The tribes in Arizona and New Mexico remained relatively undisturbed by the white man. Most of those in Oklahoma, however, were forced into this territory by the white man. A brief summary of the history of several of these tribes will indicate why the knob situation among the tribes of Oklahoma appears so complex. The Kiowa, Mescalero, and Zuñi tribes are the only ones that came to Oklahoma from the southwest, and they were not pushed there by the white man. The other tribes came from elsewhere. For example, the Cherokee tribe originally was spread over a wide area to the east of Oklahoma. On the knob map, representatives of this tribe are placed not only in Oklahoma but also in North Carolina. The Cheyenne tribe was pushed south from North Dakota by the Sioux Indians and then the tribe separated into two branches, one going into Arkansas. This branch probably is the one represented on our map. The Shawnee (the name means "southern") were originally from Ohio but they went south into Georgia, Texas, and Oklahoma. The Seminoles were originally from Georgia but they were forced into Southern Florida (one group) and into Oklahoma (another group) by the white man. And so it goes for all other tribes in Oklahoma. The knob studies show that these tribes must have brought their maize with them as they migrated.

This is strikingly illustrated by the knobs in maize of the Apache-related Kiowa and Mescalero tribes. They are the same as those in maize collected from the tribes in Arizona and New Mexico. Again, the knobs in the Zuñi maize of North Dakota relate to those in maize of the southwest. As far as Oklahoma is concerned, maize was brought into its territory from all directions. This knowledge gives a reason for the diverse knob constitutions that you discovered in the maize of this region. It also helps in projecting the knob constitutions of the Northern Flints.

Conclusions on the origin of maize in the southern-eastern part of the U.S. also can be supported by comparative studies. Again, relationships based on knob constitutions are in good agreement with those based on morphological characters. The morphological characters were outlined in a paper by Bill Brown and Edgar Anderson that appeared in the Annals of the Missouri Botanical Garden (vol. 35, pages 255-268, 1948). They relate Gourdseed and Shoepeg to Pepitilla in Mexico. They place Tuxpan, Jellicorse, and Mexican June within one complex which they call the "Mexican June Complex" and relate the morphological characters of this complex to those of maize grown in Central Mexico. Hickory King they place in a separate category, stating that it resembles the Mexican race, Tabloncillo. They also recognized that the Dent maize in the southeastern part of the U.S. had been mixed with the Northern Flints which, in turn, resemble maize grown in the highlands of Guatemala. All of this fits nicely with knob types and their distributions in these strains. Thus, the previous commercial, open-pollinated, southern dent maize varieties collected by Bill Brown, represent a mixture of germplasms derived from different sources: the Gulf Coast region (the Tuspeño complex), the Central Mexico area (Pepitilla, Tabloncillo, and possibly other sources) and the Northern Flints, originating probably from the highlands of Guatemala or possibly from the Central Mexican highlands.

In order to comment with confidence on your February 11 enclosure to me, which considers the Central America-Caribbean area, I felt obliged to reorganize the data given to us in January by Blumenschein. This became a larger task than initially considered. It soon became apparent that the data from all of South America needed to be reorganized. This task is not yet completed. Nevertheless, already it has allowed some interesting correlations to be made that otherwise might have been obscured. Later I will send some of this information to you. It is evident that an understanding of the Caribbean region requires detailed information not only on knob distributions but also on other aspects. There is now a fair amount of information derived from archeological and historical studies. In all respects, the Caribbean region is complex. It is the region that both divides and integrates two basically different original types of agricultural materials and methods.

There is another difficulty that complicates interpretations of knob constitutions of maize in the Caribbean area. Data from Central America and the Islands are given in "plants" whereas those from other regions are given in "chromosomes." This makes it impossible to make accurate comparisons between these regions or even

within the Central American and Island areas on a quantitative basis. Comparisons based on qualitative analyses do allow quite valid conclusions. I am only concerned that care be taken in making conjectures based on "plant" data.

In your letter of March 16 you asked my opinion of the possibility of having Blumenschein's data tables typed in Mexico. If this type is to be used in both publications--yours and Blumenschein's--then I see no reason why you should not ask him for them. If they are ready for typing, he could send them directly to you.

The section of your report on Geographical Regions was very well done. That on Materials and Methods also is well done. I have not yet had time to study carefully the section on Results that arrived more recently. I will do this as soon as opportunity permits and send comments to you. This may take several weeks as I must be at Cornell University for a period of one or two weeks beginning in a few days from now.

Thank you for sending me a number that I might use to telephone to you. I had hoped to receive some word from either Roberts or Wellhausen about your situation. They may not consider it necessary to contact me again. If you have not had any word from Wellhausen let me know and I will telephone to Roberts again.

Sincerely,

Barbara McClintock