The presence of knobs in the chromosomes of corn (*Zea mays*) and its related genera teosinte (*Euchlaena mexicana, Schrod.*) and gama grass (*Tripsacum sp.*) has been clearly demonstrated by McClintock (5) and Longley (1). Mangelsdorf and Reeves (3) and Mangelsdorf and Cameron (2) have demonstrated an association of knobs with certain plant characters. With these results as a basis, they formulated the hypothesis that the original corn was knobless, and that knobs in corn were derived by repeated crossing with teosinte, which in turn was derived from previous hybridization between corn and *Tripsacum*.

More recently, Mangelsdorf and Smith (4), in a study of the prehistoric corn cobs found in Bat Cave in New Mexico, present evidence which indicates that primitive corn was both tunicate and a popcorn, and that teosinte came into existence some time later and played a very important part in the subsequent evolution of corn. It is thus entirely possible that corn may have received at least many of its knobs from teosinte. The knobs themselves may have no genetic effect but may have associated with them segments of teosinte germplasm homologous or partially homologous to segments in maize. If Mangelsdorf and Reeves (3) are correct in their hypothesis that teosinte originated as a cross between corn and *Tripsacum*, then the germplasm might well be *Tripsacum* germplasm.

Wellhausen et al. (8), in a study of the races of corn in Mexico, found that the most productive races of corn all show a strong introgression of teosinte. Furthermore, races which were derived from the intercrossing of two other races in general had a higher chromosome knob number than the average of the putative parents. In certain races of hybrid origin the knob number was higher than that of either one of the parents. This indicated that there might be some relationship between chromosome knob numbers and yield in corn, although Vachhani (7) found no relationship between chromosome knob numbers and the various plant characters, including yield, in a study of 20 corn inbred lines of diverse origin used in the breeding program of the Minnesota Agricultural Experiment Station.

In order to obtain additional data on the suggested relationship, the following study was designed to determine the association, if any, between chromosome knob number of an inbred line and its yield capacity in topcrosses, comparing lines within many different varieties of corn in Mexico.

**MATERIALS AND METHODS**

The experiment was divided into two parts, each involving different types of corn. The first involved inbred lines with high and low combining ability (as determined with the same tester in two different localities) from races of corn: Celaya, Tabloncillo, Pepitilla, and Cónico Norteño. The races best adapted to intermediate elevations of 4,500 to 6,000 feet elevation. Inbreeding was done at 5,000 feet elevation. The tester used was a single cross of two S1 lines, one from the race Celaya. Chromosome knob numbers were counted in lines with high and low combining ability within each of 12 different varieties of corn representing races Celaya, Tabloncillo, Cónico Norteño, and I intermediate between Celaya and Tabloncillo. Comparisons from Pepitilla, 1 intermediate between Celaya and Tabloncillo, and 1 intermediate between Celaya and Tabloncillo, of knob numbers were made between high and low combining within each variety. The amount of inbreeding in each line was from 1 to 5 generations.

The second part of the experiment involved open-pollinated varieties and inbred lines derived from the race Chalqueño, which is best adapted to altitudes of 6,500 to 7,500 feet. The tester parent used here was an open-pollinated variety called Urquiza, of the race Chalqueño. This variety is fairly well adapted to conditions and has a knob number about equal to varieties of the races. Chromosome knobs were counted on the best inbred lines with high combining ability compared to those with low combining as determined in topcrosses) from each variety compared to the knob number of the variety from which they were derived. The lines in this second part were derived with 4 to 6 generations of inbreeding and selection at 7,500 feet.

**EXPERIMENTAL RESULTS**

The average chromosome knob number of corn with high combining ability compared to those with low combining ability within each of 12 different varieties of corn representing races Celaya, Tabloncillo, and Cónico Norteño, may be seen in table 1.

The number of high or low combining lines involved in the comparison for each of the varieties varied and the number of plants in which knobs were present for each line varied from 1 to 19. It is evident that there is a great deal of variation in knob numbers in inbred lines of a single variety and the knob number of an individual line is not necessarily indicative of combining ability. Table 2 presents data on the average number of all high combining lines and all low combining lines for each of the 12 different varieties.

As shown in table 2, lines with the high combining ability have a greater average knob number in all varieties except G.20 and J.35A. The average difference is 0.47. Although the results are variable and differences are very small in some of the varieties, the data indicate a relationship between knob number and combining ability.

Table 3 shows data obtained in the second part of the study with a different type of corn (Chalqueño), and it shows the comparison of the average knob number of the open-pollinated variety from which the inbred lines were derived to the average knob number of all the inbred lines used in the experiment. In the 13 different groups or varieties, the average difference is 1.12.