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1. Some effects of semi-sterility.

In making up several popcorn double-cross and 3-way hybrids, several single-cross hybrids were used which were semi-sterile because of a reciprocal translocation. In routine testing of 24 such hybrids, separate measurements were made on grain from plants bearing semi-sterile and normal appearing ears. Differences between semi-sterile and normal were highly significant in all cases. Some of the measurements are given below.

Ear type	Ears per plot	Equilibrium Grain Moisture at 70% R.H.	Popping Expansion popped raw	Popping Expansion Cu. in. per lb.	100 kernel weight (gms)	100 c.c. weight (gms)
Normal	27	13.9	33.8	930	12.17	156
Semi-sterile	36	13.3	36.0	1010	13.31	153

Since grain was not crowded on the semi-sterile ears, the larger kernels and lower test weight were not surprising. However, based on other work, we expected that kernels from the normal ears with heavier test weight would expand more in popping than the grain from the semi-sterile ears. Also, the smaller kernels of the normal ears came to equilibrium in a constant humidity chamber at a higher per cent grain moisture than the larger kernels from the semi-sterile ears. This factor alone could have been responsible for the difference in popping expansion. However, when both types were brought to the same grain moisture level, the differences became slightly larger. The magnitude of this difference and the fact that it was in the opposite direction expected from physical measurements in other data suggest the possibility of position effect, or different endosperm/embryo or endosperm/ pericarp ratios.

Two lines are now being used in a back-crossing program in an effort to obtain genetically identical lines with different chromosome structure in order to study this effect in more detail.

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