Interrelations Among Factors Influencing the Oil Content of Corn

A. M. Brünson, F. R. Earle, and J. J. Curtis

Corn oil is the most valuable, per unit of weight, of any major product of the corn milling industry. An appreciable increase in the commercially extractable oil in that portion of our corn crop produced for industrial utilization offers attractive possibilities to corn breeders if it can be accomplished without lowering the yield or sacrificing other desirable qualities. In both the wet-milling and dry-milling processes only the oil in the germ is commercially extractable. The oil in the endosperm is not recoverable and if present in too high percentage may even be a hindrance to the efficient extraction of starch and other products.

It has been shown by Woodworth (7) that the oil content of a strain of corn can be modified by ear-to-row selection over a period of years. Such selection has resulted in strains with high- and low-oil content of 12.02% and 1.62%, respectively.

Earle, et al. (3) found, in 11 corn varieties and strains hand-dissected, what appears to be a high positive correlation between the amount of oil in the grain and the amount in the germ.

Since only the oil in the germ is recoverable under present processing methods, it appears that in breeding for higher oil content it would be advisable to determine the proportion and composition of the germ independently of the remainder of the kernel. Accurate germ separation of laboratory samples has been made only by hand and this is a slow and expensive operation. This paper reports the results of studies initiated mainly to determine if it is necessary to hand-dissect the kernels before chemical analysis.

MATERIAL AND METHODS

The material used consisted of 57 hand-pollinated ears from F2 plants of crosses between a number of inbred lines and the Illinois High Oil strain. Although the group is not entirely homogeneous from a statistician's viewpoint, it includes a