

INTRODUCTION.

The yield of a crop is a complex character and is the end result of a number of contributory factors. These factors may be divided into two groups :-

Firstly, there are aspects of the external and internal environments that influence the expression of the inherent productive ability of the plant. Both quality and quantity may not reach their maxima because of external agents such as climate, soil, disease and pests, and internal conditions such as the malfunctioning of physiological and biochemical processes. It is emphasised that these internal disorders may be deleterious to the fitness of the plant itself or simply to its economic acceptability. The external environment may influence the metabolism of the plant, which in turn may affect yield, but it may also alter the final productivity directly. For example, the mechanical damage due to wind or pests may be described as a direct effect of environment on final yield.

The effects of both internal and external environment are influenced to a greater or lesser degree, by the genotype of the crop-plant. Thus a plant may possess inherent resistance to the various adverse aspects of its external environment, and the many metabolic processes that contribute to yield are under genetic control.

Much of the work in plant-breeding for yield has been concentrated on this first group of factors. This is because many of them are fundamentally controlled by a relatively simple genetic mechanism, and therefore show quick response to selection. For example, a quantitative improvement in yield has been achieved by selection for rust-resistance in wheats and lodging-resistance in maize, and qualitative improvements by the lowering of the hydrogen cyanide content of clover. Such improvements in resistance to adverse conditions will bring about an increase in the total yield per acre.

∟This ...