A PROCEDURE OF POSSIBLE VALUE IN PLANT BREEDING

In a series of papers published between 1927 and 1937, European workers reported that selection for high osmotic pressure of the germinating seed resulted in rather astounding yield increases and improved agronomic characteristics of the selected material. Since no reference to these papers in particular or to the field in general has been found in the American literature, the subject is presented here in the hope that new research will be stimulated to evaluate its theoretical basis and its practical potentiality.

Since a considerable amount of literature has been adequately reviewed by Buchinger (5), only certain principal references will be considered here. The work of Buchinger (the principal exponent) and others was done principally with cereals, but both monocots and dicots have been used. Their claims, including increased cold resistance, higher baking quality (of wheat), longer fibers (of cotton), and increased vigor in general, are extremely broad; yet the data available seem to bear out the general thesis.

Methods

Investigators have used various methods. One, in solutions of varying osmotic strength and based on the results obtained, is the general method. Both salt and sugar solutions have been used. A desirable solution strength would need to be determined empirically and would doubtlessly depend upon the species studied. Other methods might be considered such as using more than one strength of solution and basing selection on the pattern of germination encountered, or using a single solution but varying its concentration over a period of time. Several more elaborate procedures have been described for measuring the osmotic value of germinating seed. Buchinger (5) presents a critical discussion of such methods and their implications.

Published September, 1954