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The mechanism of interaction

When two varieties of a crop species such as rice, wheat and barley are grown together, one generally influences the yield of the other. The nature of interaction usually differs with the kind of mixture, the varieties mixed, and the ecological conditions.

Experimental evidences suggest that biologically active substance or substances produced by the roots play an important role. The components faring better in mixtures may make different demands on the soil and such varieties may also suffer from complementary metabolic deficiencies. The favourable effects in mixtures may, in many cases, be due to the complementary morphologies of roots, stems and leaves of the component varieties. Disease-buffering effects of varietal mixtures in rice, wheat and oats are found to prevail. One has to consider seriously the method of selection that a breeder should adopt from points of immediate as well as long-term advantages. Two varieties in a mixture may differ in their germination periods, in the rates of growth and in their developments. In each case one variety has physiological and ecological advantages over the other. Inter-varietal mixture offers the possibility of cross-pollination, to a certain degree, in a normally self-pollinated species which certainly has, in general, some favourable effects but also unfavourable in certain cases. A non-lodging variety offers mechanical support to a lodging associate in a mixture. The mechanism of interaction is indeed highly complex and is not fully understood. The final growth expressions, the success and failure of the components of a mixture seem to be governed by a complicated interplay of complicated factors in a complicated way. What is generally observed is actually the end picture which seems to be the result of sum-total effect of a number of factors, each acting at different points of development, such as biological, biochemical, environmental and physical, that regulate the intricate web of conjoint life in a genotype community. It is not possible yet to attribute to any individual factor its exact contribution to intervarietal interaction and no single law can be formulated at present to explain this intricate process of biological interaction which would be universally valid.

However, the existence of intervarietal interaction is a fact. It is also a fact that the available results on intra-specific interaction of cereals show a distribution of performance skewed in favour of mixtures and that certain pairs outyield the better yielding components grown in monoculture. If so, the possibility of exploiting this co-operative interaction demands serious consideration.