2-2) Distribution of color genes in South America. We found out that the use of linkage testers is of little use, owing to the complications, caused by the effect of modifying factors, mainly with regard to aleurone color. These testers have not, in general, strong enough modifier complexes, to balance the effects of the strong modifier complexes of old colorless races. Thus the following method was adopted. All old colorless indigenous races were crossed to one old indigenous colored type, Negrito from the Baranquilla area in northern Colombia, where samples were collected in 1949 both from farms and from Indians. The segregation in the F_2 ears (on F_1 plants) caused an apparent randomization of the two modifier complexes, that of the purple Negrito in favor of color and that of the colorless races in favor of colorlessness. The color of F_1 ears cannot serve as a very clear indication of genes present, owing to the lack of equilibrium of the modifier complexes in the triploid endosperm, and consequent differences between reciprocal crosses. Some ears showed a clear segregation, but segregations into groups with different ratios. The F_2 segregations in about 20 F_2 ears of some 50 crosses for purple versus colorless aleurone shored that most colorless races have one or two recessive color inhibitors. The segregations thus correspond to a 3:1 segregation or 9:7 ratio, but owning to incomplete dominance and interactions in the triploid endosperm about 32% colorless kernels instead of 25% were observed in the first case and up to 60 or 65% colorless kernels instead of 43% in the latter. The percentage may go up to 70 or even 80%, indicating that the incomplete dominance of the color factors must have changed into recessiveness. So far no clear evidence of the existence of different allels [sic] for either recessive, intermediate, or dominant inhibitors for anthocyanin were found. The segregations for colored (brown or yellow) aleurone against colorless followed either a 3:1 or a 15:1 ratio and the same occurred for the contrast yellow/colorless endosperm. With regards to the latter contrast, it should be mentioned that some ears showed in F_2 only yellow endosperm, though one parent (Negrito) has white endosperm.

The unexpected result of these crosses was that all three color contrasts may be caused by either one or two, generally recessive inhibitors of color. In each case we must further assume, that one of each of these three factor pairs has a more general distribution, since colorless x colorless always gives colorless. Thus an interesting, evolutionary problem arises, and we must explain why a second recessive mutant character can be accumulated to a rather high degree, even though it has generally no phenotypic effect; the complete inhibition of color is already caused by one of the recessives, when homozygous. We may furthermore say that the only selective advantage of the presence of two recessive inhibitors should be the fact, that in this way mutations of either one remain hidden in the populations.

Many new crosses were carried on between Negrito and colorless races from Mexico, received from Dr. Wellhausen, and with the Caingang races of our collection. The ears of F_2 will be collected in a few weeks.

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