

4. Albino corn seedlings as a tool in studies of the obligate parasitism.

Stocks of dent and sweet corn, which segregated 3:1 for normal vs. albino seedlings were used to determine the role of chlorophyll in obligate parasitism.

Dr. Victor Cutter (1951) conducted two experiments to determine the role of photosynthesis in obligate parasitism. He inoculated green virescent and albino corn seedlings of one strain with aecio-spores of *Puccinia sorghi*. These were grown in sterile agar cultures using Hoagland's nutrient solution plus 2 per cent dextrose supplied to the roots. One series of the plants was kept in the light, the other in dark. These plants became infected in direct proportions to the amount of chlorophyll present. Hypersensitive flecks showed on the albino plants maintained in the light with no sign of infection on the plants kept in the dark. In another experiment Dr. Cutter inoculated the variegated leaves of *Geranium maculatum* with teliospores of *Puccinia-polygoni-amphibii*. In all cases infection was confined to the green portions of the leaves, whereas adjacent chlorophyll deficient parts show no sign of infection. This evidence suggested that in addition to carbohydrates and minor elements, the rusts derive other essential metabolites from their hosts. This material is synthesized in the light and is unstable since it is not conserved during dark periods.

The present author inoculated albino dent and sweet corn seedlings devoid of all known chloroplast pigments with uredospores of *Puccinia sorghi*. The seedlings were supplied with 0.3M sucrose solution through their leaf tips. Sugar feeding was initiated when the seedlings were eight days old and the solution was changed daily. The roots were supplied with Hoagland's complete nutrient solution in sand culture. These albino seedlings became severely infected with corn rust and characteristic sori in great numbers were produced on the infected leaves, Thus, the absence of chlorophyll from the albino corn seedlings did not influence the development of the obligate parasitic fungus, when the host plants were provided with an adequate supply of carbohydrates. These results indicate that the failure of the albino corn seedlings to show infection with *Puccinia sorghi* in Dr. Cutter's experiment was not due to the lack of an assumed labile transition product of photosynthesis, but rather, that it is a direct result of an inadequate supply of available carbohydrates. A second factor involved is the presence of genetic resistance or susceptibility to disease in albino as well as in green maize stocks.

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