Genetics of Resistance in Maize to a Mosaic-Stripe Virus Transmitted by *Peregrinus maidis*

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ACORN MOSAIC or corn stripe virus transmitted by the leafhopper, *Peregrinus maidis*, severely stunts corn in Hawaii and other parts of the tropics (1, 2, 3, 4, 6). Commercial sweet corn hybrids are susceptible to the virus. Genetic resistance for the present study was derived from Hawaiian Sugar, a variety tracing back to the tropical sweet corn, USDA34. Resistant inbred lines were crossed with susceptible inbreds and studies were made of F₁, F₂, and backcross progenies.

The widely variable symptoms of corn mosaic, in common with most viral diseases, are readily classified into several classes of severity to which neither the standard methods of phenotypic variance analysis nor those of discrete ratio analysis are directly applicable. Elements of both of these approaches were applied in defining the genetic basis for mosaic resistance.

**MATERIALS AND METHODS**

Resistance to corn mosaic virus was first recognized in an early Puerto Rican sweet corn variety, 'USDA 34.' During World War II, the mosaic resistant Hawaiian Sugar was bred by A. J. Mangelsdorf from crosses of USDA34 and the mosaic susceptible 'Golden Cross Bantam.' Inbreds derived from Hawaiian Sugar have been used in breeding Hawaiian hybrids. Six resistant Hawaiian inbreds were used in the present study and labeled R₁, R₂...R₆. The following mainland inbreds served as susceptible parents:

- **S₁** = C68 (Connecticut Agr. Exp. Sta.)
- **S₂** = C42 (Connecticut Agr. Exp. Sta.)
- **S₃** = P51 (Purdue University)
- **S₄** = 647: 60 cr. 2. (Everglades Exp. Sta., U. Florida)
- **S₅** = 650: 60 cr. 3. (Everglades Exp. Sta., U. Florida)

The following 10 F₁ hybrids and their respective BC (backcross) and F₂ progenies were studied:

| H₁ | S₁ × R₁ | H₆ | R₂ × S₁ |
| H₂ | S₂ × R₁ | H₇ | R₃ × S₁ |
| H₃ | S₃ × R₁ | H₈ | R₄ × S₁ |
| H₄ | S₄ × R₁ | H₉ | R₅ × S₁ |
| H₅ | S₅ × R₁ | H₁₀ | R₆ × S₁ |

In this manner, each of the susceptible inbreds was tested against the resistant inbred R₁, and each resistant inbred was tested against the susceptible inbred S₁.

The most unique symptom of the corn mosaic virus is a striping due to chlorosis directly above the veins (Figure 1). This striping contrasts with the interveinal chlorosis characteristic of many viral and deficiency diseases, and can always be observed in the flag leaves (tips of ear husks). Varying degrees of internodal dwarfing accompany the virus (Figure 2). Corn mosaic virus is not transmitted to sugar cane (Kunkel 1921) and was shown by Kunkel (1927) to be distinct from the aphid-transmitted sugar cane mosaic virus.