SEVERITY of northern corn leaf blight caused by Helminthosporium turcicum Pass, is characterized by extensive seasonal variation. Relatively cool weather accompanied by heavy dews and high humidity generally is considered as favoring the disease, while warm, dry weather checks it (16). Differences in severity are due to variation in environment (3), in pathogenicity of the causal organism (7, 11, 12, 14), in host resistance (2, 4, 5, 6) and to interactions of these factors.

Because of variation in the severity from natural infection, artificial epiphytotics are frequently established for selection in breeding programs. In such programs, F2 and backcross populations of corn (Zea mays L.) have shown continuous gradation from high resistance to high susceptibility without segregation into distinct classes, indicating that numerous genes are involved (16). After inoculation, resistant strains show fewer but essentially similar lesions as compared with those on susceptible plants. Resistance usually is not expressed fully until plants are 6 to 8 weeks old (15).

Recently an apparently different type of resistance to H. turcicum has been reported which shows smaller lesions with chlorotic margins and inhibited sporulation (9). Progeny tests suggest simple inheritance of a single dominant gene for resistance which was obtained from both a prolific dent, GE440, and Lady Finger popcorn. While simplifying the selection for blight resistant strains per se, these nonsugary sources may complicate subsequent selection for quality in sweet corn where quantitative characters such as flavor, texture, pericarp tenderness and color must be considered. On the other hand sources of multigenic blight resistance are already available in some high quality sweet corn lines.

The experiments here reported concern development of northern corn leaf blight on greenhouse-grown corn seedlings as influenced by temperature, seasonal effects including primarily light, rate of inoculum, age of seedlings, interval between inoculation and time of indexing, and by source of inoculum. Disease indexes obtained with these techniques and environments are compared with indexes from field grown plants. Evaluation of strains following seedling or young plant inoculation, if feasible, would be useful since emphasis could be given in summer field breeding programs to those lines which winter greenhouse or early summer assays have shown to carry a measure of resistance (10).

MATERIALS AND METHODS

The genetic material consisted of inbred lines of corn previously screened for a range of response to H. turcicum. These inbreds, listed in Table 1, will be designated by their respective