DEPARTMENT OF PHYTOPATHOLOGY
WAGENINGEN AGRICULTURAL UNIVERSITY

Peronospora farinosa. f. sp. *chenopodii*. in Quinoa (*Chenopodium quinoa*. Will) aspects of epidemiology and resistance.

A thesis submitted to the Department of Phytopathology in partial fulfilment for the degree of M. Sc. in Crop Protection.

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January, 1995

Wageningen-The Netherlands

Exp. 1 Variation in virulence of twenty Ecuadorian isolates of quinoa downy mildew (*Peronospora farinosa* f. sp. *chenopodii*) on quinoa (*Chenopodium quinoa* Will)

Summary

Using 60 quinoa accessions and 20 downy mildew isolates, a scale for scoring quinoa downy mildew was developed, 4 virulence groups and 3 resistance factors were identified. Genotypes ECU-291, ECU-470, ECU-379 and ECU-288 are proposed as a preliminary quinoa differential set for identifying quinoa downy mildew virulence groups.

Two types of hypersensitivity were identified in this study. "Highly hypersensitivity" (Reaction type 0), characterized by absence of perceptible necrosis and "delayed hypersensitivity" (reaction type 1), characterized by visible necrosis.

The distribution of the different virulence groups was correlated with their geographical origin. In the most traditional quinoa growing area all virulence groups were found, in the less traditional region only the virulence group 2 was found. In the area where quinoa cultivation is promoted, only the most virulent isolates (virulence group 4) were found. No resistance factor was effective against the newly arisen population of the fungus.