Development of a model defining relationship between field weather variables and incidence of grape downy mildew in Semi-arid conditions on São Francisco valley

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A set of weather variables obtained in grape yards in the São Francisco valley were evaluated to define the correlation to Downy Mildew (*Plasmopara viticola*) incidence. Using the time series studies procedures Spectral analysis and Lag Cross Correlation was defined a delay of 6 days from environmental events and field detection of symptoms. The variables continuous hours of RH greater than 80%, hours of continuous temperature from 20°C to 25°C, and rainfall showed greatest R^2 in Step Wise Multivariate Regression. Using these variables a forecast model was developed to predict infection periods of *P. viticola* to the semi-arid conditions characteristic to the São Francisco valley. According to data, maximal infection should appear between 12 and 20 continuous hours showing RH greater than 80% and temperature varying from 20°C to 25°C. Rainfall greater than 5 mm was associated with high disease incidence, which should be magnified if followed by warmer temperature. Based on these variables a polynomial model was obtained and a matrix for combination of accumulated times of RH superior to 80% and accumulated medium temperature determining the environmental favorability index. At this moment Embrapa Semi-Árido and grape producers evaluate the model to schedule fungicide spray.