Internet Based Forecasting System

Introduction, basic system description, future possibilities

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Damage in orchards caused by bacteria Erwinia Amylovora (so-called Fireblight) has been noticed in Croatia in 1995.

In order to prevent and detain its dispersion, the Law that regulates measures for protection of orchards against this parasite has been adopted, and the pest has been registered in the National List of Quarantine Diseases and Pests.

The Faculty of Agronomy and Croatian Institute for Agricultural Extension Service have been collaborating in testing the applicability of several forecasting models in local environmental conditions. The problem of gathering and dissemination of data collected in the fields, data input in the forecasting model and presentation of results obtained by the forecasting model, will be solved by the development of internet based program solution.

Current forecasting models requires systematic compilation and registration of data from each specific location (site), for which the forecast has been done. During blossom period, daily minimal- and maximal temperature have to be registered, humidity, as well as the presence of dew, fog, rain, frost, hail, and type and power of wind. Moreover, it is necessary to monitor the flight of honeybees, which are important vectors of this disease. It is substantial to determine the precise time of infection, as it is the only moment when the efficient protection of trees can be accomplished.

During the analysis of applicability of some forecasting models in our climate, all required data have been coming on a daily basis to the Institute for Phytopathology of the Faculty of Agronomy in Zagreb, and it was necessary to copy them to the application with forecasting model. Field assistants have been notified by phone or fax if the conditions for infections have occurred. Several disadvantages of this system have been noticed: mistakes in

calculations caused by badly written data, wrong data input in the application with forecasting model, as well as lack of possibility to monitor more sites simultaneously due to lack of qualified staff.

This service will be developed in two steps:

1. WWW service for collection of necessary field information – the form for data input will carry out the input control, and report unclear information to the user and enable its correction. Data will be prepared as text file for existing application with the forecasting model and at the same time saved in the special database.
2. WWW presentation of forecasting results and warning system: – graphical presentation of status of forecasting parameters with registered time of possible infection for each monitored site respectively.

Warning system will use two current GSM networks for SMS text messages and fax service. Croatian Agriculture Extension Service uses significant numbers of field data loggers and weather stations but data are manually collected trough RS-232 interface to PC application with forecasting model. There is an option to use field logger with GSM data transfer so whole system can be improved significantly.

Also, can be useful for disease forecast models based on filed data collected for Fireblight forecast. Those are diseases of significant importance such are Tomato and Potato Late Blight (caused by fungi Phytophtora Infestans), Pear and Apple Scab (caused by fungi Venturia Pirina and Venturia Inaequalis) and Plasmopara Viticola on Grapes.

Refrences:
PestCAST – Disease model database
http://www.ipm.ucdavis.edu/DISEASE/DATABASE/diseasemodeldatabase.html
Smith Fireblight model
http://www.ncw.wsu.edu/FB2000f.htm