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The WRF-ARW application in predicting meteorological conditions for Downy mildew (Plasmopara viticola) appearance of wine grape

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Results of numerical weather prediction of different time scales (short term, monthly and seasonal) can be used as input data for crop models and models used in plant protection. This operational technique is showing results in the optimisation of field operations (fertilisation, irrigation) and protection measures against plant diseases and pests. The ongoing climate change in Central and South-Eastern Europe lead to shifts of crops phenology dynamics (i.e. in Serbia 4-8 weeks earlier in 2016 than in previous years) and increased rate and diversity of plant diseases and pests, which brings this subject in the front of agronomy science and practice.

Objective of this study is to test the efficiency of the latest-generation numerical weather prediction model Weather Research and Forecasting Model with Advanced Research core (WRF-ARW) in predicting appearance of the downy mildew (Plasmopara viticola) in wine grape. Algorithm for predicting the downy mildew in wine grape, developed by the Forecasting and Warning Service of Serbia in plant protection, was calibrated with observed agro-ecological and meteorological conditions and validated against observations. Results obtained using WRF-ARW runs as meteorological input data, were compared with the observations. Obtained results indicate great potential in using the short range numerical weather prediction in predicting meteorological conditions for downy mildew appearance in wine grape.