DYNAMIC MODEL OF GRAPE SEASONAL DEVELOPMENT

L. Yu. Novikova[1,2], L. G. Naumova[3]

[1]*Federal State Budgetary Scientific Institution «Federal Research Center the N. I. Vavilov All-Russian Institute of Plant Genetic Resources», 190000, St. Petersburg, 42-44 B. Morskaya*
[2] *Peter the Great St.-Petersburg Polytechnic University, 195251, St. Petersburg, 29 Polytekhnicheskaya*
[3]*Federal State Budgetary Scientific Institution «Research Institute of Viticulture and Winemaking named after Ya. I. Potapenko», 346421, Novocherkassk, Rostov region, 166 Baklanovskiy pr.*

By means of correlative and regression analysis of phenology of 71 grape varieties from the ampelographic collection of Research Institute of Viticulture and Winemaking named after Ya.I. Potapenko (Rostov Region), the rules of the temperature regulation of the grapes phenology have been revealed. These rules have been summarized in a dynamic model. The model is based on the following assumptions: the state of plant is described by the temperature to which the plant is currently adapted; the higher the difference between the air temperature and the state of plant, the higher the speed of change in the state of the plant; when the minimum temperatures of the plants needed for budding and blooming are reached, these phenophases start; the duration of the period of «blooming-ripening» depends only on the variety. Previously the parameters of 6 groups of varieties with different ripening periods have been determined. This study is devoted to the verification of the model with the help of observation data on the phenology of 6 grapes varieties with different ripening periods in 1981–2016. The average error for the dates of the beginning of bud blossoming was 3–4 days, for the dates of the beginning of ripening – 5–8 days, for the dates of the beginning of full berry ripening – 5–9 days, for the duration of the production period – 6–10 days (or 5–7%). The error in forecasting the dates of the phenophases beginning was 0-5 days for budding, 2–7 days for blooming, 5–12 days for ripening and 0–8 days for full berry ripening; the error in determining the duration of the production period was 1–14%. Based on the obtained results, a conclusion about the adequacy of the model was made.

Key words: phenology, grapes, speed of development, temperature base.