

Modelling of Peach Tree (*Prunus persica*) Full Blooming Dates Using APCC MME Seasonal Forecasts

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Due to global warming, recently, bud-burst and flowering dates of fruit crops have become earlier and the abnormal climate increases the variabilities of temperature in spring, suggesting that the risk of frost damage has increased. However, the full blooming date prediction model for peach tree used by the Rural Development Administration (RDA) were developed using only one cultivar (Youmyeong) and observations from a station (Suwon). This model might not adequately reflect the characteristics of peach cultivars or local orchards. the objectives of this study were to develops the site-and cultivar-specific blooming date prediction models for major peach cultivation regions and cultivars and presents a framework for applications of the APEC Climate Center Multimodel Ensemble (APCC MME) seasonal datasets. Developmental rate (DVR), and Sequential dormancy models (Chill day, New chill day, and fraction-time models) were used to develop the locally tailored full blooming date prediction models for major peach cultivars. For the development of these models, bud-burst and full blooming dates of peach tree for 5 cultivars (Cheonhong, Youmyeong, Changbangjosaeng, Cheonjoongdo, and Janghowon) were collected from the 6 major peach cultivation sites: Chuncheon, Suwon, Cheongwon, Cheongdo, Naju, and Jinju. For the chill day model, those measures for the entire dataset regardless the location and cultivar were 2.31%, 0.79, and 3.36 day for MAPE, R², RMSE, respectively. For the new chill day model, those values (2.19%, 0.82, and 3.16 day for MAPE, R², RMSE, respectively) were slightly better than those of the chill day model. The model results showed that the new chill day model was found slightly highest performance than others. Based on the considerations of the predictability of the statistical downscaling method and the observed periods of the full blooming dates at each site, we determined that the APCC MME seasonal datasets were applied for the new chill day model for the Changbangjosaeng and Youmyeong cultivars at the Suwon site. The values of the goodness-of-fit measures using the selected synthetic daily maximum and minimum temperatures reflecting APCC MME seasonal datasets and selected were worse than those using those collected from the Suwon station. It is concluded that further work was recommended that the predictability of APCC MME seasonal forecasts should be improved to reduce the prediction errors of full blooming dates of peach trees.