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# Agricultural pests under future climate conditions in Switzerland

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As a consequence of current and projected climate change in temperate regions of Europe, agricultural pests and diseases are expected to occur more frequently and possibly to extend to previously unaffected regions. Given their economic and ecological relevance, detailed forecasting tools for various pests have been developed, which model the infestation depending on actual weather conditions. Assessing the future risk of pest-related damages therefore requires future weather data at high temporal and spatial resolution. In particular, pest forecast models are often not based on screen temperature and precipitation alone (i.e. the most generally projected climate variables), but might require input variables such as soil temperature, in-canopy net radiation or leaf wetness. Here, we use a combined stochastic weather generator and re-sampling procedure (HOWGH, presented in a separate contribution) for producing site-specific hourly weather series representing present and future (2060) climate conditions in Switzerland. To generate future climate weather series, the weather generator parameters are modified according to the climate change scenarios, which are derived from the ENSEMBLES multi-model projections and provide probabilistic information on future regional changes in temperature and precipitation. Hourly temperature, precipitation and radiation data were produced by first generating daily weather data for these climate scenarios and then using a nearest neighbor re-sampling approach for creating realistic diurnal cycles. These hourly weather time series were then used for modeling important phases in the lifecycle of codling moth, the major insect pest in apple orchards worldwide. Results indicate a shift in the occurrence and duration of phases relevant for pest disease control for projected as compared to current climate. This potentially leads to a more frequent establishment of an additional 3rd codling moth generation in Northern Switzerland. I.e., the potential risk for a 3rd generation increases from 1% today to over 50% in 2060 for the median signal of the multi-model projections. As a consequence, this would require an intensification of control measures (e.g., insecticides), implying also an increased risk of resistances.

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