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Understanding the population dynamics subject to seasonally changing weather conditions plays a fundamental role in predicting the trends of population patterns and disease transmission risks under the scenarios of climate change. With the host-macroparasite interaction as a motivating example, this talk proposes a synthesised approach for investigating the population dynamics subject to seasonal environmental variations from theoretical point of view, where the model development, basic reproduction ratio formulation and computation, and rigorous mathematical analysis are involved. The resultant model with periodic delay presents a novel term related to the rate of change of the developmental duration, bringing new challenges to dynamics analysis. The synthesised approach developed here is applicable to broader contexts of investigating biological systems with seasonal developmental durations. (Received August 31, 2017)