**ReadMe for “Population dynamics analyses.R”**

This ReadMe gives a brief overview of how to use “Population dynamics analyses.R”. ***Please note that running this script is not strictly necessary for the populations in the manuscript as all model predictions already exist in “Predictions population dynamics.csv” the “Model predictions” folder.***

**Input:** User-defined species name and location for an insect population or *all* = TRUE

**Output:** Updated “Predictions population dynamics.csv” in the “Model predictions” folder (if *save* = TRUE) for either a specified population (if *all* = FALSE) or all populations (if *all* = FALSE)

**To run:**

1. Update variable *species* (line 13) and *location* (line 14) with a species name and location from “Temperature response parameters.csv” or set *all* = TRUE to run the analyses for all populations
2. To save model predictions (over existing files in “Model predictions” folder), change *save* from FALSE to TRUE in line 18
3. Run the script

**Potential issues:**

* The script only works if the working directory (see line 9) is in the main folder of the downloaded GitHub repo
* The variable *species* (line 13) and *location* (line 14) must exist within “Temperature response parameters.csv” and match the “Population” and “Location” columns exactly

**Script details:**

Lines 5-18 Load required packages, set working directory and have user enter required information

Lines 21-30 Read in temperature response parameters and habitat temperature parameters and create data frame for results and for populations that go extinct in the population model

Lines 33-59 Get parameters for selected population, read in DDE model time-series data, and determine if the population has gone extinct and remove any data after the extinction

Lines 61-71 Define habitat temperature function (Eq. 5) and start and end times for integrating model population dynamics

Lines 74-95 Integrate model population dynamics in the recent climate by quantifying mean adult density and active period and then the coefficient of variation of adult density from model time-series data (mean adult density and coefficient of variation of adult density are set to zero for populations that have gone extinct)

Lines 98-119 Integrate model population dynamics in the future climate by quantifying mean adult density and active period and then the coefficient of variation of adult density from model time-series data (mean adult density and coefficient of variation of adult density are set to zero for populations that have gone extinct)

Lines 122-143 Record results, end for loop, and output results in CSV file (if save = TRUE)