

Mosquito Landscape Simulation

This suite of codes predicts *Ae. aegypti* abundance in a given location, using time series for temperature, precipitation, and relative humidity as input.

- **Main program:** MoLS
- **Arguments:**
 1. `weather_pathname` (string): directory where input file is located
 2. `weatherfile` (string): name of weather data file in csv format, without the .csv extension
- **Format of input file (`weatherfile.csv`):** 9 columns showing (1) year; (2) month; (3) day; (4) maximum temperature; (5) minimum temperature; (6) precipitation in mm; (7) average temperature; (8) precipitation in cm; (9) relative humidity.
Note: only columns 7-9 are used.
Template: see example in `Weather` subdirectory
- **Main program calls:**
 - `preprocess_weather_file` calculates water levels, EIP rate, and mosquito life landscape as functions of temperature, precipitation, and relative humidity. Other parameters are species (currently only species 5, *Ae. aegypti*, is considered) and `H_on` (whether or not relative humidity is taken into account for adult survival). This program calls:
 - `read_local_parameters`
 - `water_levels`
 - `devel_rates_aegypti`
 - `death_rates_aegypti`
 - `EIP_rate`
 - `mosquito_landscape`
 - `abundance_aegypti`, which calculates predicted abundance of gravid females. This program calls:
 - `read_local_parameters`
 - `read_abundance_model_parameters`
 - `sgl_ftr`
 - and internal function called `egg_life`
- **Output:** `weatherfile.xlsx`, containing the same data as `weatherfile.csv` plus an additional column with the predicted number of gravid females per day.
- **Test run:**
 - Copy all of the distribution files in your working directory.
 - Start Python and run `Run_Model.py`.
 - This should create an Excel file called `Test_Data.xlsx` in the `Weather` directory. A plot of the data in the last column (`gravid_f`) of this file should resemble the figure below.
 - For comparison, a file called `Test_Data_for_Comparison.xlsx` is provided in the `Weather` file as well.

