

# User Documentation for ‘Modeling Asian-Papuan Admixture in Neolithic Island Southeast Asia’

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## Installation

**Computer requirements** Java v. 1.7.

**Linux and OS X** Run the command `java -jar isea_installer.jar` and follow the installer instructions. After installation is complete, either run the model from the new menu entry ‘isea’, or run the file `start_command.command` from the installation folder.

**Windows** Double click on the `jar` file and follow the installer instructions. After installation is complete, either run the model from the new menu entry ‘isea’, or run the file `start_command.bat` from the installation folder.

## Running Simulations

Figure 1 shows the GUI when starting the model. There are two main panels:

1. The settings panel on the left allows users to change the main parameter values (see below for details) in the **Parameters** tab, as well as outputs in the **Scenario Tree** tab (for advanced users only).
2. The simulation will appear in the main panel on the right.

Simulations can be started immediately using the default parameter set by clicking on the **One Step** button (red box in Figure 1). A new simulation will be initialized in the panel on the right, and the simulation can be launched by clicking the **Run** button (red box in Figure 2).

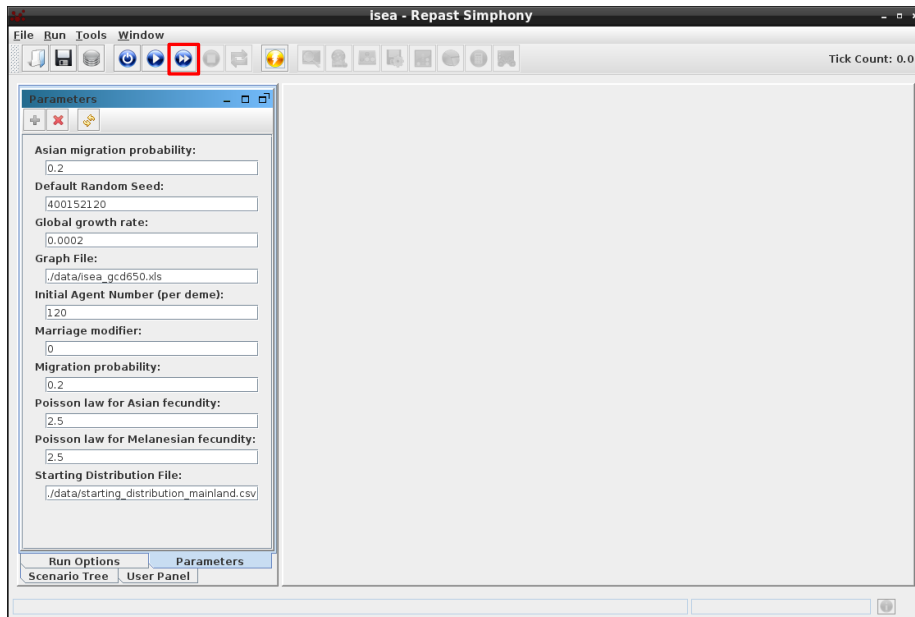


Figure 1: Start a new model. The One Step button is highlighted in red.

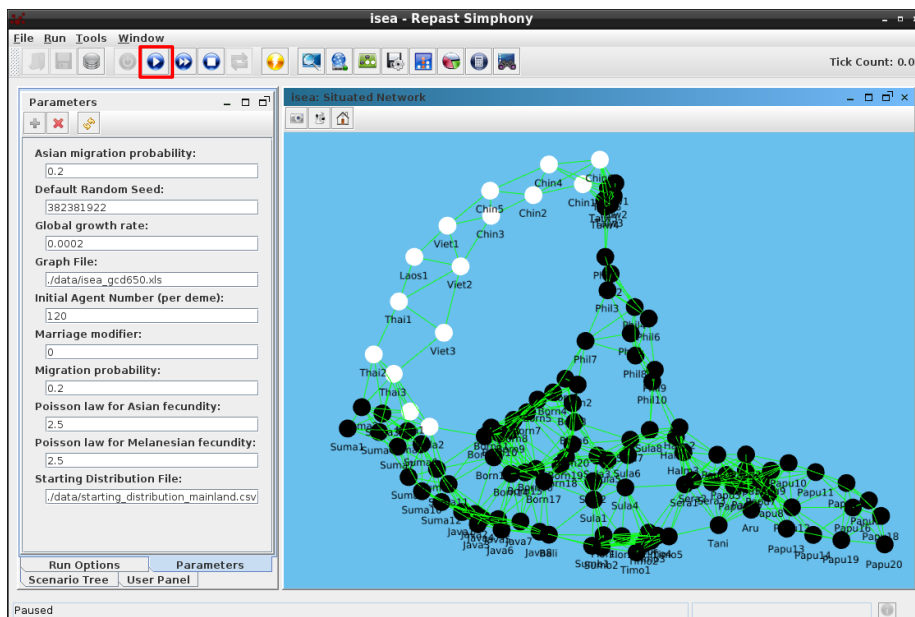


Figure 2: Run a simulation. The Run button is highlighted in red.

## Model Parameters

### Numeric Parameters

Several parameters can be changed in the settings panel. Some are easy to explore:

- `Default Random Seed`; generated automatically for each simulation.
- `Asian migration probability`; value between 0 and 1.
- `Melanesian migration probability`; value between 0 and 1.
- `Poisson law for Asian fecundity`; value between 3 and 8.
- `Poisson law for Melanesian fecundity`; value between 3 and 8.
- `Marriage modifier`; value between 0 and 0.25.

Other parameters should only be modified by advanced users:

- `Global growth rate`; should be low to avoid poor population dynamics.
- `Graph file`.
- `Initial agent number (per deme)`; better if  $>100$ .
- `Starting distribution file`.

Note that many parameter settings may produce poor quality simulations, and most will produce outcomes that have little resemblance to real world observations. Fit must be determined through statistical inference.

### File Parameters

Graph and starting distribution files must be given to the program. Examples can be found in the `data` directory within the installation directory:

- `Graph file`; an Excel file containing an adjacency matrix of the network (*i.e.*, nodes and connections).
- `Starting distribution file`; a csv file containing  $x$  and  $y$  coordinates and ancestry values of nodes for initialisation.

## Model Output

Output files are created in the installation directory following the simulation:

- `Admixture file`; lists Asian admixture rates at the last step.
- `First time of admixture`; lists the time step at which the first admixture event occurs for each deme.