Evolution Simulations

Introduction

Evolution is a cumulative change in the heritable characteristics of a population (and is evidenced by a change in allele frequencies). Evolutionary change may be driven by natural selection, whereby the environment acts on the variation in a population to cause certain features(adaptations) to become more or less common. Natural selection is a gradual process, but can be modelled by simulations.

Aim

To demonstrate the process of natural selection using online, computer-based simulation software.

SIMULATION 1: Peppered Moth

Method

1. Go to website: https://askabiologist.asu.edu/games-sims/peppered-moths-game/play.html
2. Choose an environment for the purpose of the experiment (either light forest or dark forest)
3. Click on as many moths as possible in 60 seconds (try to aim for at least 60 moths)
4. Record the percentage of white moths and then repeat the simulation for the other type of forest

Results

Table 1: Percentage of white moths after 60 seconds of predation

Forest	1	2	3	4	5	6	7	8	9	10	**Mean**
Light											
Dark											

Discussion

1. Explain the results according to the process of natural selection

SIMULATION 2: Newbyte Evolution Lab

Method

1. Go to website: https://mynewbyte.com and choose Evolution lab (requires a school subscription)
2. Select the first landscape (6 concentric land masses) and set the sea level to 3 to form islands
3. Set the inheritance to complete dominance and ensure a 1:1 ratio of the red and yellow beetles
4. Shade each island a different colour (shading options are under the 'selection' tab within the lab)
5. Run the simulation for 15 weeks and record the data in the table below

Results

Table 2: Beetle population numbers over 15 weeks

Beetle Colour	**Island Colour**					
	Red	Orange	Yellow	Purple	Green	Blue
Red						
Yellow						

Discussion

1. Contrast the conditions best suited to the red beetles versus the yellow beetles

2. Predict the expected ratio of red : yellow beetles if no natural selection occurs (random mating). Based on the data, which island best represents these conditions (and suggest a reason why).