Random Genetic Drift

Random genetic drift is the accumulation of changes in allele proportions in populations over generations. It is the effect of sampling error in the sense that an individual's genotype is essentially a 'random draw' from the gene pool of the previous generation. Thus, over time the proportion of an allele can 'drift' up or down over time. It is important to note that this is not due to any advantage or disadvantage associated with the allele (selection). Just as statistical error is greater with small sample sizes, genetic drift particularly affects small populations.

This model is an adaptation of the classic experiment conducted by Peter Buri (1956), which documented genetic drift in laboratory populations of *Drosophila*. In this model, there are two alleles for a gene coding for eye color: the dominant wild type allele (+) codes for red eye color, while the recessive mutant allele (*bw*) codes for brown eye color. In the model, ten vials (populations) of flies are held at a constant population size and the proportions of the *bw* allele are tracked over generations (Figure 1). The population size and the initial allele proportion can be manipulated.

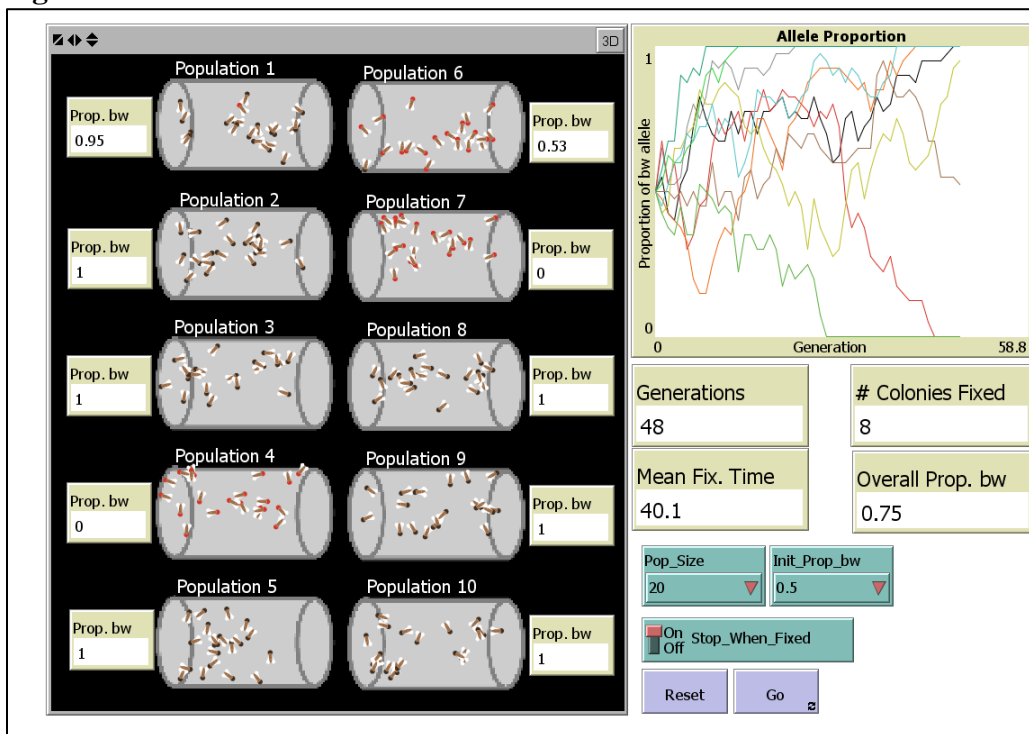**Figure 1.** Screen shot of the Random Genetic Drift model

Table 1: Reporters for the Random Genetic Drift model

Reporter	Description
Prop. bw	The current *bw* allele proportion for individual populations
Allele Proportion (Graph)	Plot of *bw* allele proportions over generations; each trace is a separate population
Mean Fix. Time	The average number of generations taken for the colonies to reach an allele proportion of 1.0 or 0
Overall Prop. bw	The proportion of the *bw* allele across all ten colonies

Table 2: Controls for the Random Genetic Drift model

Control	Action
Reset	Clicking clears all values, resets model to current parameter settings
Go	Clicking sets the model in motion (clicking again will stop it)
Stop_When_Fixed	When switched on, automatically stops the model when *bw* allele proportions reach 1.0 or 0 in all the populations
Pop_Size	A drop-down menu to set the number of flies held in each vial (options: 5, 10, 20, 40, 80)
Init_Prop_bw	A drop-down menu to set the initial proportion of the *bw* allele in all the populations (options: 0.1, 0.25, 0.5, 0.75, 0.9, 1.0)

Reference

Buri, P (1956). Gene frequencies in small populations of mutant *Drosophila*. Evolution 10: 367-402.