

POPULATIONS & GENETICS



long neck

EVOLUTION THEORY

Darwin 1859

published *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*

promoted variation rather than transformation as the basis for modification

DARWIN'S THEORY

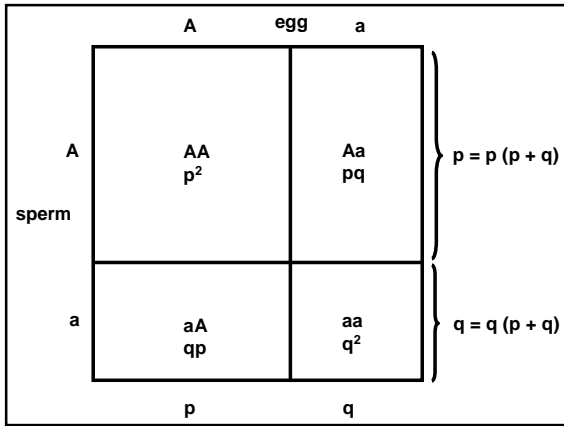


comprises three fundamental principles

variation among individuals

heredity from one generation to the next

selection operates (reproductive performance in the particular environment)



HARDY-WEINBERG RULE

Equilibrium

- no mutation
- no recombination
- no migration
- no 'drift'
- no bias in matings
- no selection

	AA		Aa		aa
	p^2	+	$2pq$	+	q^2
1 =	p^2		$2pq$		q^2

EXERCISE

AA	Aa	aa
p^2	$2pq$	q^2
0.3	0	0.7
0.2	0.2	0.6
0.1	0.4	0.5

calculate proportion (i.e., "frequency") for A

determine expected genotype proportions

SELECTION

AA	Aa	aa
p^2	$2pq$	q^2
$W_{AA} p^2$	$W_{Aa} 2pq$	$W_{aa} q^2$

$$W = W_{AA} p^2 + W_{Aa} 2pq + W_{aa} q^2 \neq 1$$

$$W_{AA} p^2 / W \quad W_{Aa} 2pq / W \quad W_{aa} q^2 / W$$

$$p_{n+1} = p (p W_{AA} + q W_{Aa}) / W = p W_A / W$$
