Genome 562
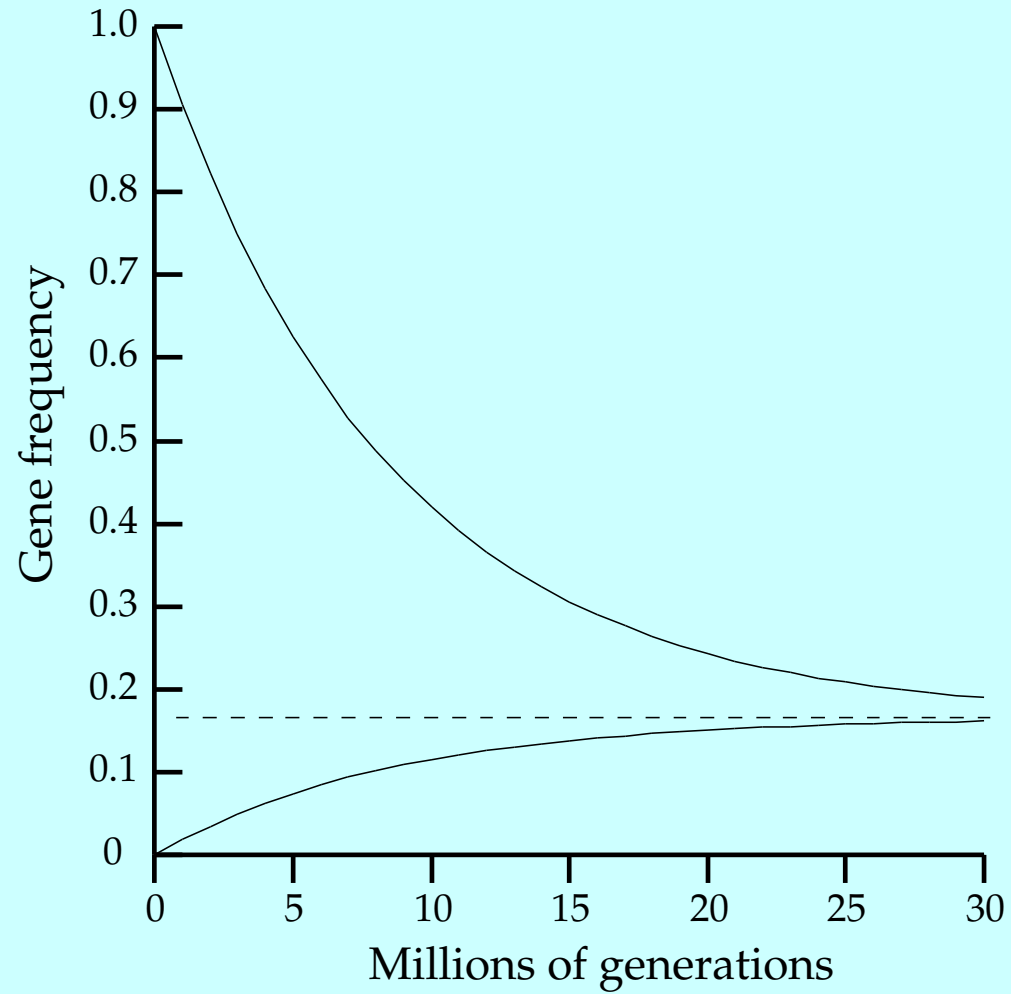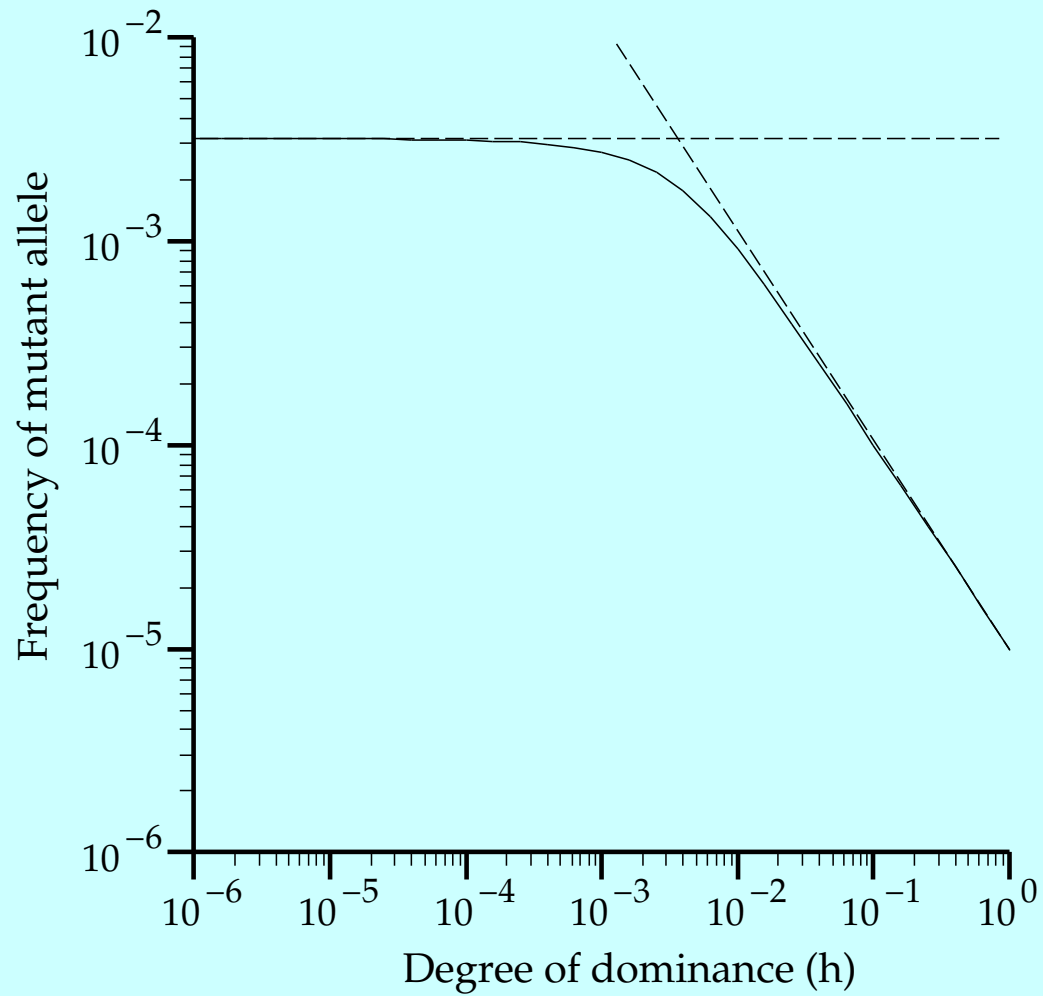
February 2017

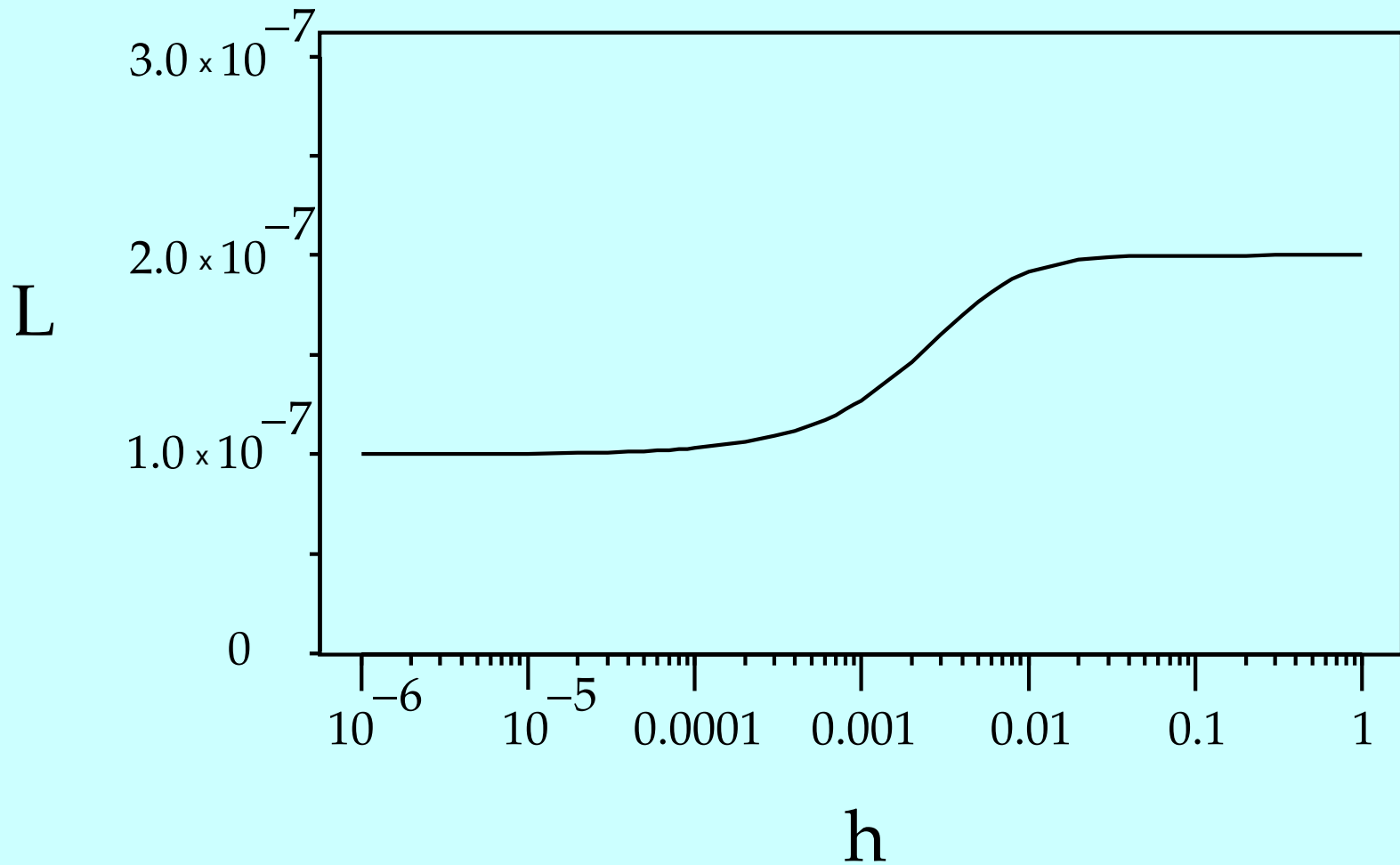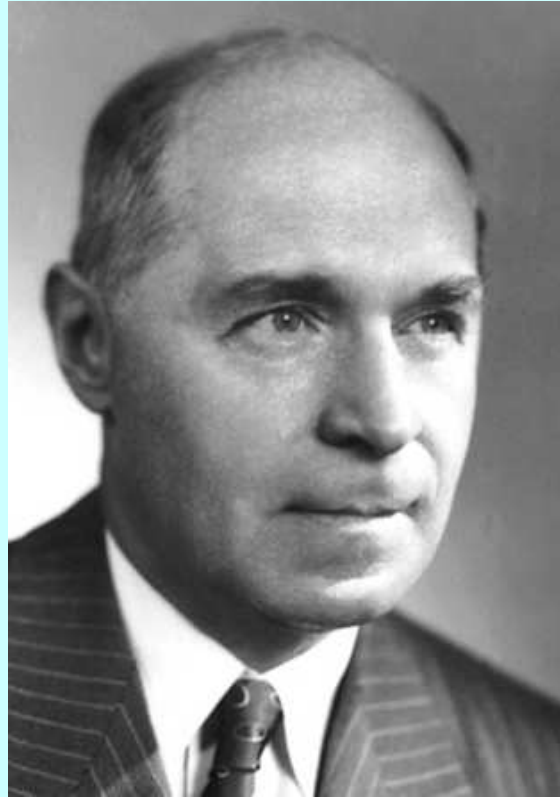Week 5

Approach to mutational equilibrium

Mutation vs. selection: effect of dominance

Mutational load: effect of dominance

Hermann Joseph Muller (1890-1967)

in about 1945

The greatest classical geneticist. Nobel Prize in 1945. Proved by elegant chromosome manipulations that radiation could induce mutations.

Has "junk DNA" been a delusion?

The 2012 papers by the ENCODE project reported that "These data enabled us to assign biochemical functions for 80% of the genome, in particular outside of the well-studied protein-coding regions."

Popular science news media ran with the dramatic story (summary from T. Ryan Gregory's "Genomicron" blog):

- New York Times – Bits of Mystery DNA, Far From 'Junk', Play Crucial Role
- Los Angeles Times – ENCODE project sheds light on human DNA and disease
- Washington Post – 'Junk DNA' concept debunked by new analysis of human genome
- Wall Street Journal – 'Junk DNA' Debunked
- USA Today – Researchers: 'Junk' DNA plays major role in disease
- NPR – Scientists Unveil 'Google Maps' For Human Genome
- CNN – DNA project interprets 'book of life'
- Scientific American – Hidden Treasures in 'Junk' DNA
- MSNBC – New DNA project shows us living beyond our genes
- The Guardian (UK) – Breakthrough study overturns theory of 'junk DNA' in genome
- The Independent (UK) – Scientists debunk 'junk DNA' theory to reveal vast majority of human genes perform a vital function
- The Telegraph (UK) – Worldwide army of scientists cracks the 'junk DNA' code
- The Economist (UK) – The new world of DNA
- New Scientist (UK) – Global project reveals just how active our 'junk' DNA is
- BBC (UK) – Detailed map of genome function
- The Globe and Mail (Canada) – Worldwide group of scientists solve 'junk DNA' mystery
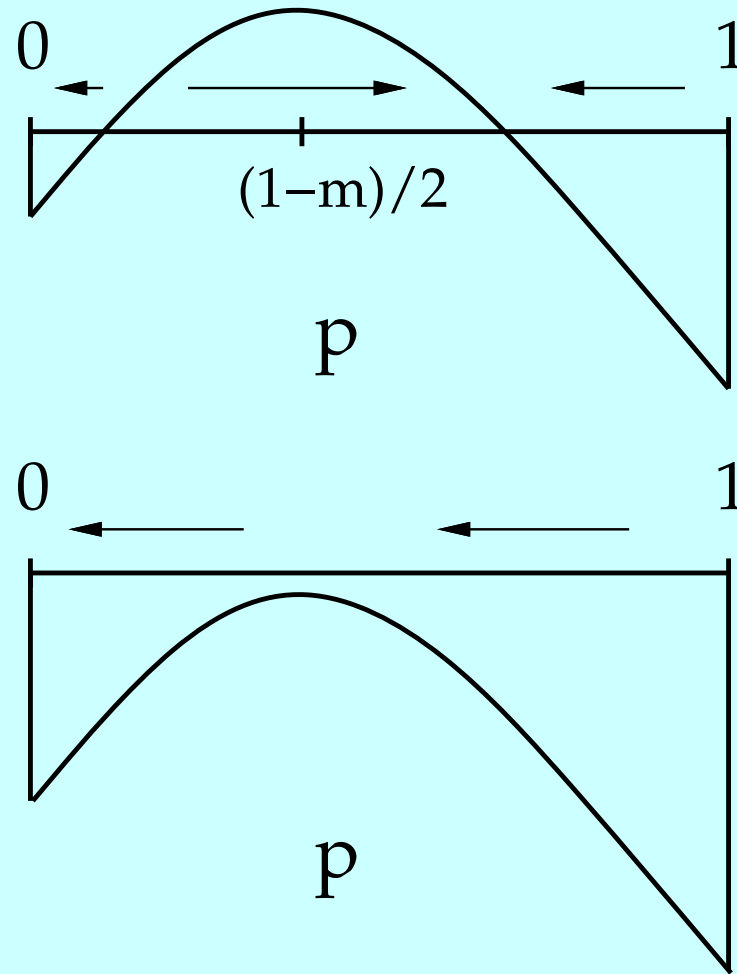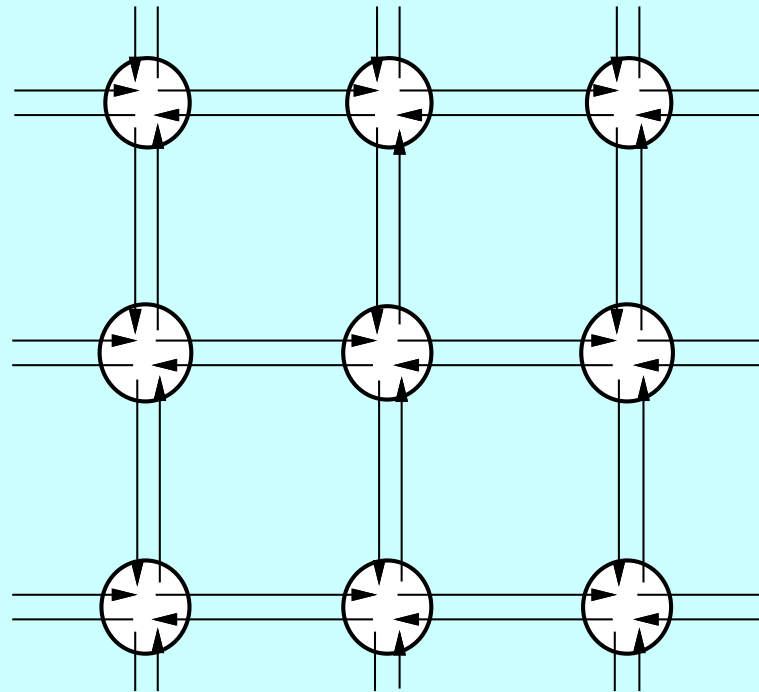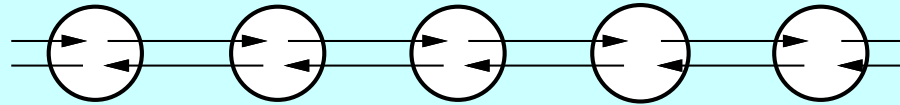
But is it true?

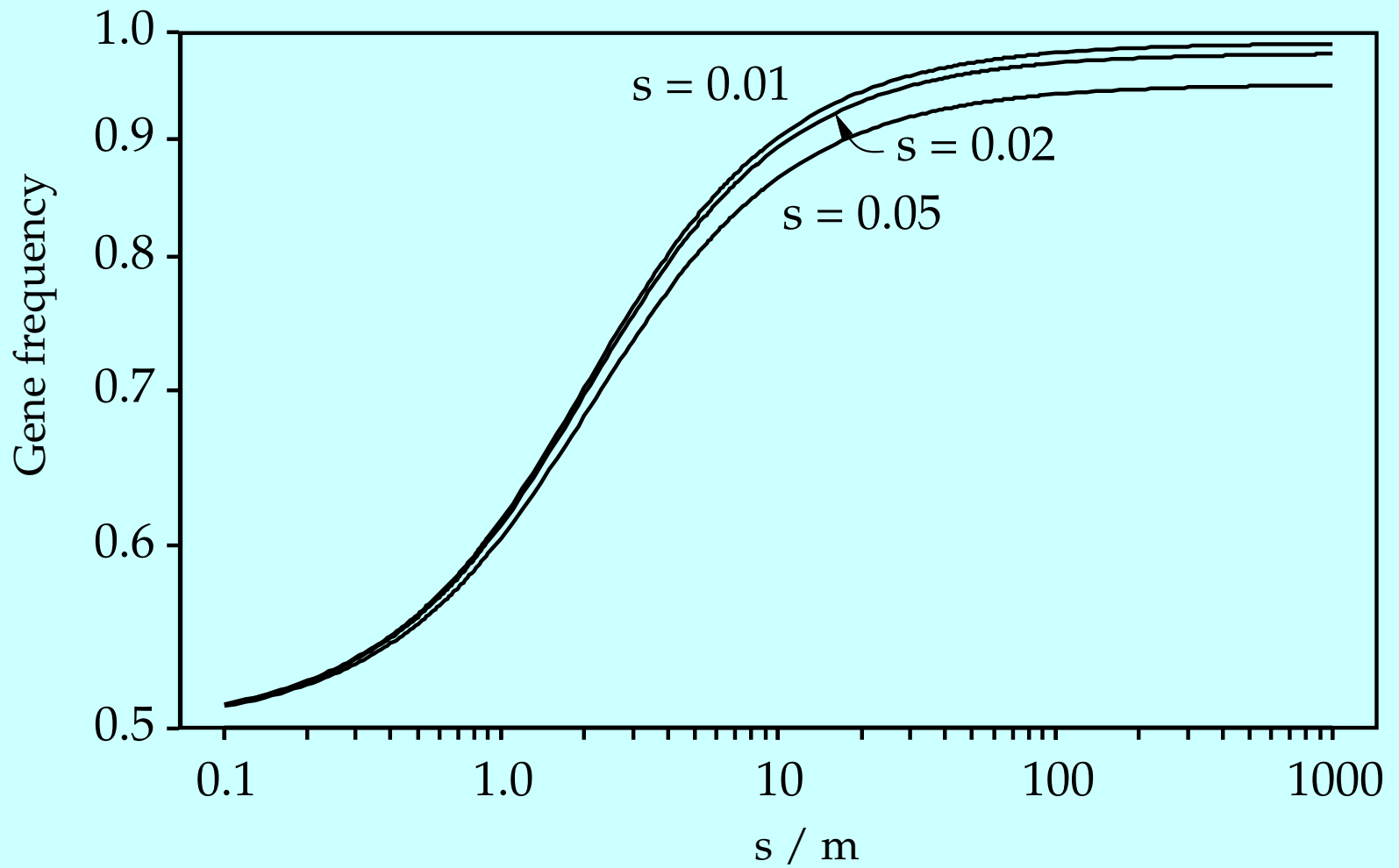# One-island model

Island   m   Continent
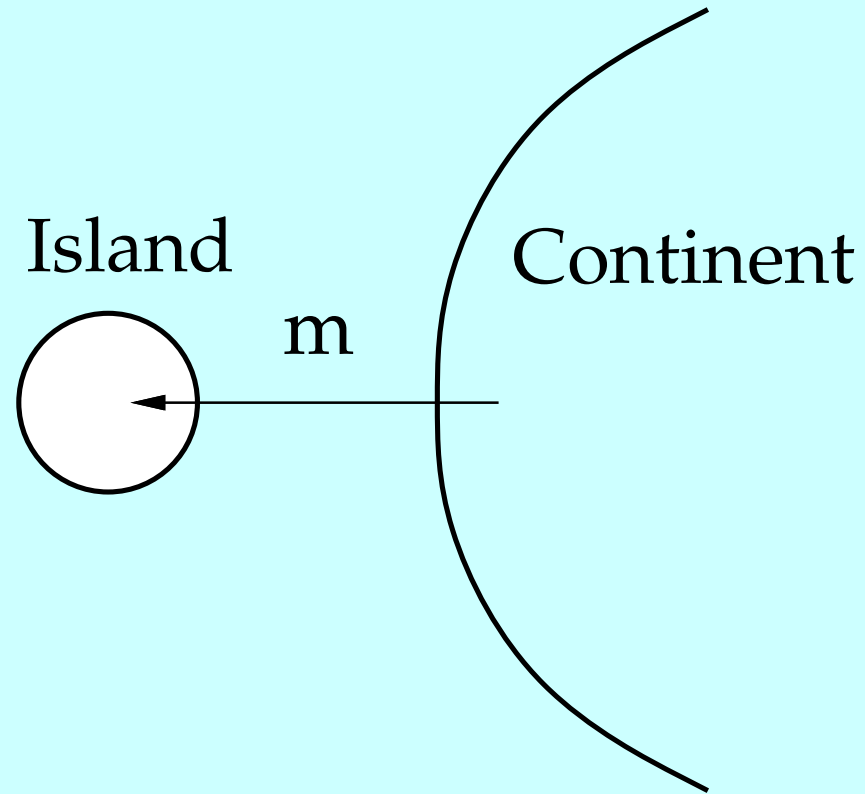
Island model
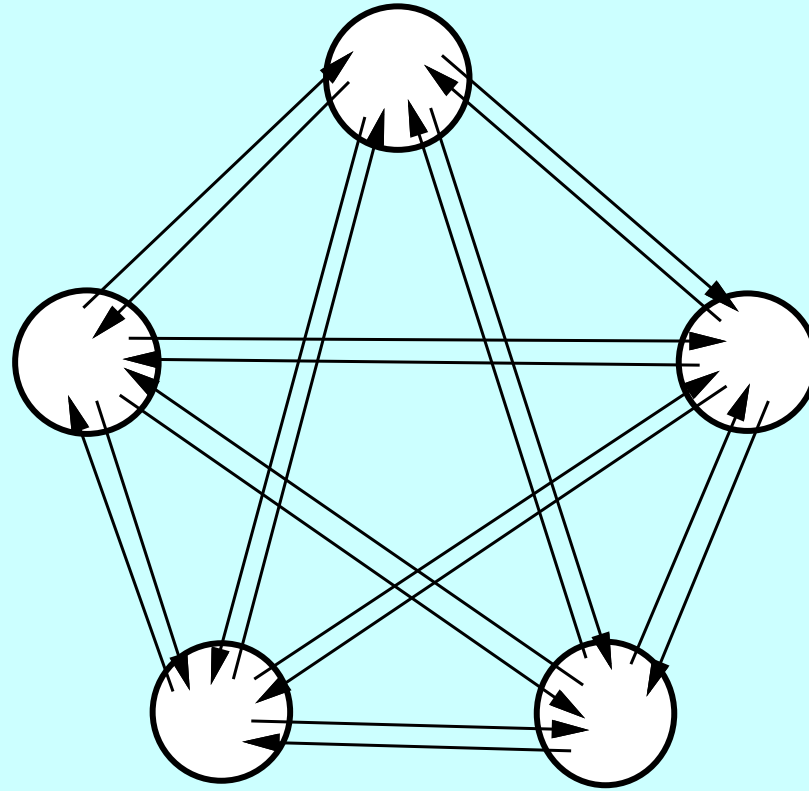
Collapse of a patch of adaptation

Stepping-stone models

Selection versus migration: two populations

Clines