B2 Ecological Genetic Hypotheses

But first, an aside on types of selection...

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Density - Dep. Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>Hard Selection</td>
</tr>
<tr>
<td>Dependent</td>
<td>Soft Selection</td>
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</tbody>
</table>

* Here, the Rare Advantage depends on density

* A side on Ideal Free Distributions

* Soft Selection has multiple definitions
Abiotic Env.
\[ \text{TEMPORAL} \quad \lor \quad \text{SPATIAL} \]
\[ \text{BIOTIC ENVIRONMENT} \]
\[ \lor \quad \text{INTRA-SPECIFIC} \quad \lor \quad \text{INTER-SP} \]

\[ \downarrow \]

**Hard Selection**
- due to unpredictable environmental change
  \[ \downarrow \]
  - Lottery Models
    \[ \text{Best Man Hypothesis} \]

\[ \downarrow \]

**Soft Selection**
- due to competition for resources in a heterogeneous spatial env.
  \[ \downarrow \]
  - Tangled Bank Hypothesis

\[ \downarrow \]

**Time-Lagged Freq.-Dep. Selection**
- due to antagonistic coevolution
  \[ \downarrow \]
  - Red Queen Hypothesis

\[ \text{Sib Comp} \]
Burt & Beye (1987)

Red: Domesticated

High recombination is an adaptation to an environment characterized by intense selection in small populations for novel combinations of traits.

Recombination removes negative correlations between desired characters.

Tangled Bank: More recombination in larger litters. "Age to maturity correlates negatively with litter size."

Red Queen: More recombination in longer lived species. "Greater time between generations → more contrary environment."

Note: Longevity in mammals and litter size is negatively correlated.

Decision: Reject tangled bank.

"Red Queen ... accounts for 75% of the variation in excess chiasmata freq."