**Dominance vs. Founder Controlled Community**

- **Founder controlled community** - Early community determined by dispersal ability
  - R-selected
  - K-selected

- **Dominance Controlled Community** – Over time, poorer dispersing species (better competitors) arrive and dominate.
  - R-selected
  - K-selected

**Intermediate Disturbance Hypothesis**

- Where do we observe the greatest diversity in terms of disturbance frequency or intensity?

**Comparing communities**

- Need an index of community similarity
  - Assess resistance or resilience to disturbance
  - Assess “quality” of a system as similarity to a reference community
  - Assess rate of change in community composition

- As with diversity indices, need multiple metrics
  - Qualitative – similarity based on species presence/absence
  - Quantitative – similarity based on relative abundance
Comparing communities

- Index of community similarity
- One qualitative (Jaccards Index), one quantitative (PSI)
- Percent Similarity Index (PSI)
  - Quantitative
  \[
  PSI = \sum_{i=1}^{S} \min P_i
  \]
  - Where \( P_i \) is the proportion of the community composed of species \( i \).
  - 0.0 = species proportional abundances not similar among communities
  - 1.0 = species proportional abundances identical

PSI Example

<table>
<thead>
<tr>
<th>Species</th>
<th>Com. 1</th>
<th>Com. 2</th>
<th>( P_i ) sp. 1</th>
<th>( P_i ) sp. 2</th>
<th>Min ( p_i )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species 1</td>
<td>9</td>
<td>5</td>
<td>0.183673</td>
<td>0.084746</td>
<td>0.084746</td>
</tr>
<tr>
<td>Species 2</td>
<td>7</td>
<td>5</td>
<td>0.142857</td>
<td>0.084746</td>
<td>0.084746</td>
</tr>
<tr>
<td>Species 3</td>
<td>3</td>
<td>4</td>
<td>0.061224</td>
<td>0.067797</td>
<td>0.061224</td>
</tr>
<tr>
<td>Species 4</td>
<td>5</td>
<td>0</td>
<td>0.084746</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Species 5</td>
<td>5</td>
<td>28</td>
<td>0.102041</td>
<td>0.474576</td>
<td>0.102041</td>
</tr>
<tr>
<td>Species 6</td>
<td>25</td>
<td>9</td>
<td>0.510204</td>
<td>0.152542</td>
<td>0.152542</td>
</tr>
<tr>
<td>Species 7</td>
<td>3</td>
<td>0</td>
<td>0.050847</td>
<td>0.050847</td>
<td>0</td>
</tr>
</tbody>
</table>

N = 49 59  PSI = 0.485299

Diversity Indices

- S = 5 7
- H’ = 1.34 1.60

Jaccards Index (Qualitative)

- Species abundance ignored, only presence or absence of species used.
  \[
  Jaccards = \frac{a}{a + b + c}
  \]
  - Where
    - \( a \) = number of species in both communities
    - \( b \) = number of species unique to community 1
    - \( c \) = number of species unique to community 2
  - 0 = no species in common
  - 1.0 = all species in common

Jaccards Index Example

<table>
<thead>
<tr>
<th>Species</th>
<th>Com. 1</th>
<th>Com. 2</th>
<th>Jaccards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species 1</td>
<td>9</td>
<td>5</td>
<td>a</td>
</tr>
<tr>
<td>Species 2</td>
<td>7</td>
<td>5</td>
<td>a</td>
</tr>
<tr>
<td>Species 3</td>
<td>3</td>
<td>4</td>
<td>a</td>
</tr>
<tr>
<td>Species 4</td>
<td>0</td>
<td>5</td>
<td>c</td>
</tr>
<tr>
<td>Species 5</td>
<td>5</td>
<td>28</td>
<td>a</td>
</tr>
<tr>
<td>Species 6</td>
<td>25</td>
<td>9</td>
<td>a</td>
</tr>
<tr>
<td>Species 7</td>
<td>0</td>
<td>3</td>
<td>c</td>
</tr>
</tbody>
</table>

\[
Jaccards = \frac{a}{a + b + c}
\]

Jaccards = 0.714286