**SPECIES-LEVEL CONSEQUENCES OF DISPERSAL**

Seminar in Dispersal Evolution & Ecology

April 29, 2011

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**Group Speed Dating**

**Life-history and range expansion**-Chris

Simulation model that incorporated pop growth, dispersal

Explored life-history consequences of dispersal with two models of range expansion: free-space range expansion and one-competitor range expansion.

In the absence of competition, population front expanded faster than interior.

In the presence of one competitor (i.e., invasive sp.), invaded population adapted by putting more resources towards fecundity.

**Dispersal ability and range size**-Chad and Cynthia

Do species with larger dispersal distances have larger range sizes?

Used dataset of benthic macroinvertebrates and fish to assess this relationship.

Indexed dispersal ability by using isolation-by-distance techniques for macroinvertebrates and time length of larval form for fish.

In general, relationship was not found between dispersal distance and range size. Did hold true for some species and regions of the ocean, but may have been related to other factors (e.g. ocean currents).

Discussion of hypotheses on why dispersal distance is expected to be related to range size.

Overall conclusion was that this relationship might be true for some organisms, especially when they occur within patch habitats. But because dispersal distance was found to be only a small fraction (<5 %) of overall range size, dispersal probably plays a minor role in determining range size. Instead of representing species dispersal ability by mean dispersal distance, we should use the maximum dispersal distance represented by long distance dispersers, which probably play a key role in colonization and influencing range size.

**Intra- and interspecific dispersal in butterflies**-Nick

Examined phylogeny of European butterflies to compare interspecific and intraspecific dispersal

Used several metrics for dispersal including dispersal propensity, ability, etc.

Dispersal ability traits (particularly wing size) highly correlated within lineages (sister taxa)

Found dispersal traits as variable between related families as within family (populations)

**Gravestone lichens**-Steve and Abby

Examined 300 yrs of lichen on gravestones in Scotland, England, Wales

Used time-of-death on gravestone to age lichens

Found colonization ability associated with overall range and dispersal

Are bigger spores better dispersers? Yes

**IBD not IBS**-Matt and Amy

Simulation model starting with homogenous population containing genetically identical individuals

Random low mutation level caused genetic differentiation within population

Individual dispersal restricted to very small distances. Mating of individuals with large genetic differences produced offspring with low fitness (low viability)

Low dispersal distance and differential survival of genetically similar individuals results in formation of distinct homogenous clusters (populations) under the influence of mutation and drift only

This modeling represented genetic divergence in the absence of any natural selection pressures and provided evidence for sympatric speciation without selection

**General Discussion**

Global reading-slime molds (aka “social amoeba”)

Well studied because model organism with strange characteristics and also easy to collect from the wild

Are outliers more interesting than just correlations?

In general, slime molds show a direct 1:1 relationship between stalk width and height. Why? Mechanical property

Some molds have different ratio, why? Possibly unequal cell differentiation-more stalk than spore cells

Why did we read this? Nontechnical fun reading; Emphasizes that dispersal is the most important parameter for slime molds and many species in general.

Dispersal morphs-ant alates, naked mole rat large dispersing morph-“queen” displaces disperser to form new colony. Check out the fascinating life-history of naked mole rats-a unique eusocially structured mammal-presented by a Cornell University researcher <http://youtu.be/5yRzFZRiTjg>

**Course Wrap-Up**

Group speed dating was an excellent learning tool

During the course of the semester, we weren’t totally satisfied with one unifying definition of dispersal. Why? Because dispersal is species-specific and context-dependent

Take-Home Message: When discussing dispersal, it is imperative to explicitly define it.