Today’s Plan!

1. Read through Ryan’s email and make sure I understand everything.
2. Open mathematica script if possible.
3. Arrange Skype meeting if there are any questions.
4. Download simulation results.
5. Get archipelago/mean results.
6. Get analytic results for simulation.
7. Get NLLS results for simulation.
8. Plot on graphs for immigration, niches and theta.

Other things:

1. Order Lauren’s card and buy her bottle of wine.
2. Phone vet and check about tomorrow’s appointment.
3. Order face coverings.
4. Pay ben for food shop.
5. Cancelled Zoom subscription.

Ryan’s email!

M0 is a constant proportionality with a single proportion for all island in an archipelago, regardless of area.

M DOES vary across island areas as m = the likelihood that a specific individual will be replace by an immigrant. M = per capita rate so m = m0/sqrt(area)

X = total number of immigrants per generation to an island

J = total number of individuals on the island

Per capital immigration rate = m = X/J, so X = Jm

A = island area

ρ = individual density = J/A, so J = ρA

Consider how the total number of immigrants increases with area. Either,

1) The total number of immigrants per generation increases linearly with area

2) The total number of immigrants per generation increases linearly with island perimeter

Or an intermediate case can occur.

1) Total number of immigrants increases linearly with area

X ∝ A (the total number of immigrants per generation to an island is proportional to area)

Jm = ρAm ∝ A

The total number of individuals on the island x per capital immigration rate =

Individual density x area x per capital immigration rate proportional to area

Which then gives you…

ρm ∝ 1

Or, because rho is constant across island areas…

m ∝ 1

So the per capital immigration rate is constant with area. But this is not the case I am considering. I am looking at…

2) Total number of immigrants increases linearly with perimeter

X ∝ A (the total number of immigrants to an island per generation is proportional to island perimeter)

Which also means….

Jm = ρAm ∝ A (the total number of individuals on an island x the per capita immigration rate is equal to the population density x Area x per capita immigration rate which is proportional to island perimeter)

This can be rewritten as…

ρm ∝ or because rho is constant m ∝ which can also be written as m =

Where m0 is a constant across islands.

Questions:

Am I converting properly from km2 to mm2?

Why are my results for ACrit so low?

Can I use the Falkland Islands data?

How do I get estimates for these taxa rho?

How might sampling issues affect the number of OTUs recorded for different habitats?

Should I be using mm2 or mm3 or cm2? What is the best area metric?

How to move between a two- and three-dimensional environment?

Simulation options:

Use a timeseries to see if the islands reached equilibrium.

Can I get the islands divided into archipelagos?

Can I find their means across simulations?

^^^ Does it matter which order I do this in?

How do the analytic results compare to the known parameters?

If it is good, go ahead with the NLLS fitting, using the new tools I’ve learned today.

If it’s no good, try re-running the single simulation multiple times?