# Browne_200B_HW2

*Marvin Browne*

*March 8, 2018*

***Simulating the interactions of fundamental processes***

## 2A

```r
setwd("~/UCLA/Winter 2018/200B/Nathan-Part III/200B-Community-Ecology")

source('~/UCLA/Winter 2018/200B/Nathan-Part III/200B-Community-Ecology/3 process model.R')

par(mfrow=c(3,2))
#1
simulate_metacommunity(m=0)->output1
trace_metacommunity(output1, "neutral, J=100, m=0")
var1<-var(output1[50,])

#2
simulate_metacommunity(m=0.05)->output2
trace_metacommunity(output2, "neutral, J=100, m=0.05")
var2<-var(output2[50,])

#3
simulate_metacommunity(m=0.25)->output3
trace_metacommunity(output3, "neutral, J=100, m=0.25")
var3<-var(output3[50,])

#4
simulate_metacommunity(m=.75)->output4
trace_metacommunity(output4, "neutral, J=100, m=0.75")
var4<-var(output4[50,])

#5
simulate_metacommunity( m=1.0)->output5
trace_metacommunity(output5, "neutral, J=100, m=1.0")
var5<-var(output5[50,])

variance<-c(var1,var2,var3,var4,var5)
ms<-c(0,.05,0.25,0.75,1)
plot(ms,variance,main="Variance in Abundance after 50 Years", xlab="Migration Rate", ylab = "Variance i
```

As the amount of migration increases, the length of time necessary for the community to reach a stable species composition increases as well. Furthermore, the amount of heterogeneity in the composition across the communities decreases. Additionally, it seems to plateau at greater values of migration(See "Variance in Abundance after 50 Years")
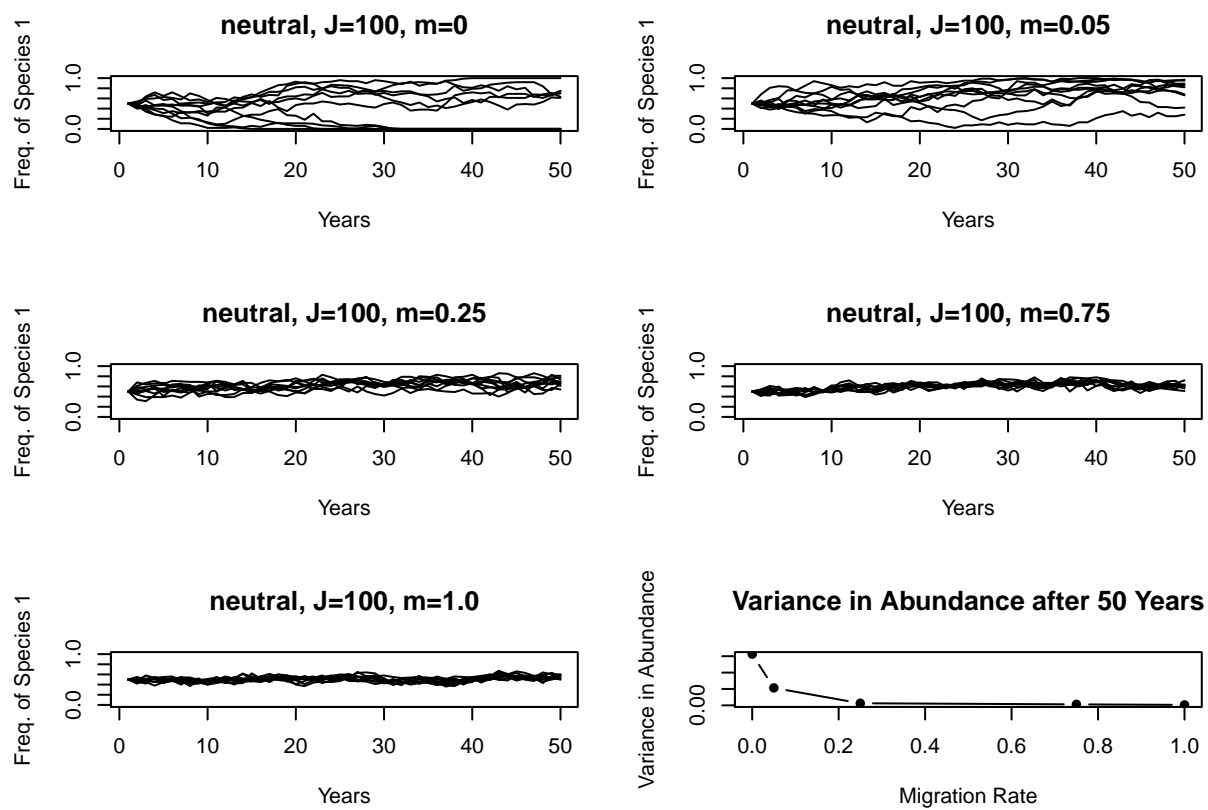
Figure 1: Interactions of Drift and Migration

## 2B

```
##How does increasing migration influence variation in community composition
##across the landscape? Howe does diversity within local communities vary with increasing migration?

par(mfrow=c(3,2))

## two symmetric patch types, + migration:
###
#6
simulate_metacommunity(m=0,fitness_ratio_ave=c(rep(1.2,5),rep(1/1.2,5)))->output6
trace_metacommunity(output6, "two habs, J=100, m=0")
var6<-var(output6[50,])

#7
simulate_metacommunity(m=0.05,fitness_ratio_ave=c(rep(1.2,5), rep(1/1.2, 5)))->output7
trace_metacommunity(output7, "neutral, J=100, m=0.05")
var7<-var(output7[50,])

#8
simulate_metacommunity(m=0.25,fitness_ratio_ave=c(rep(1.2,5), rep(1/1.2, 5)))->output8
trace_metacommunity(output8, "neutral, J=100, m=0.25")
var8<-var(output8[50,])

#9
simulate_metacommunity(m=.75,fitness_ratio_ave=c(rep(1.2,5), rep(1/1.2, 5)))->output9
trace_metacommunity(output8, "neutral, J=100, m=0.75")
var9<-var(output9[50,])

#10
simulate_metacommunity( m=1.0,fitness_ratio_ave=c(rep(1.2,5), rep(1/1.2, 5)))->output10
trace_metacommunity(output8, "neutral, J=100, m=1.0")
var10<-var(output10[50,])

variance<-c(var6,var7,var8,var9,var10)
ms<-c(0,.05,0.25,0.75,1)
plot(ms,variance,main="Patch Diversity after 50 Years", xlab="Migration Rate", ylab = "Variance in Abund
```

Increasing migration helps to keep the frequency of each species at equivalent among all of the patches. At
lower rates of migration, the fitness effects are stronger driving half of the communities to complete dominance
of one species. Furthermore, as the migration rate increases, the diverity among local communities diminishes
and eventually stabilizes at greater rates of migration similar to the findings in 2A. **INSERT THEORY
THAT IS EVIDENT**

## 2C

```
##Pick a third combination of two or more processes
##and explore how they interact. State quesiton and
##describe the simulations that will be used to
##address this. Summarize findings graphically and
##interpret them.
```
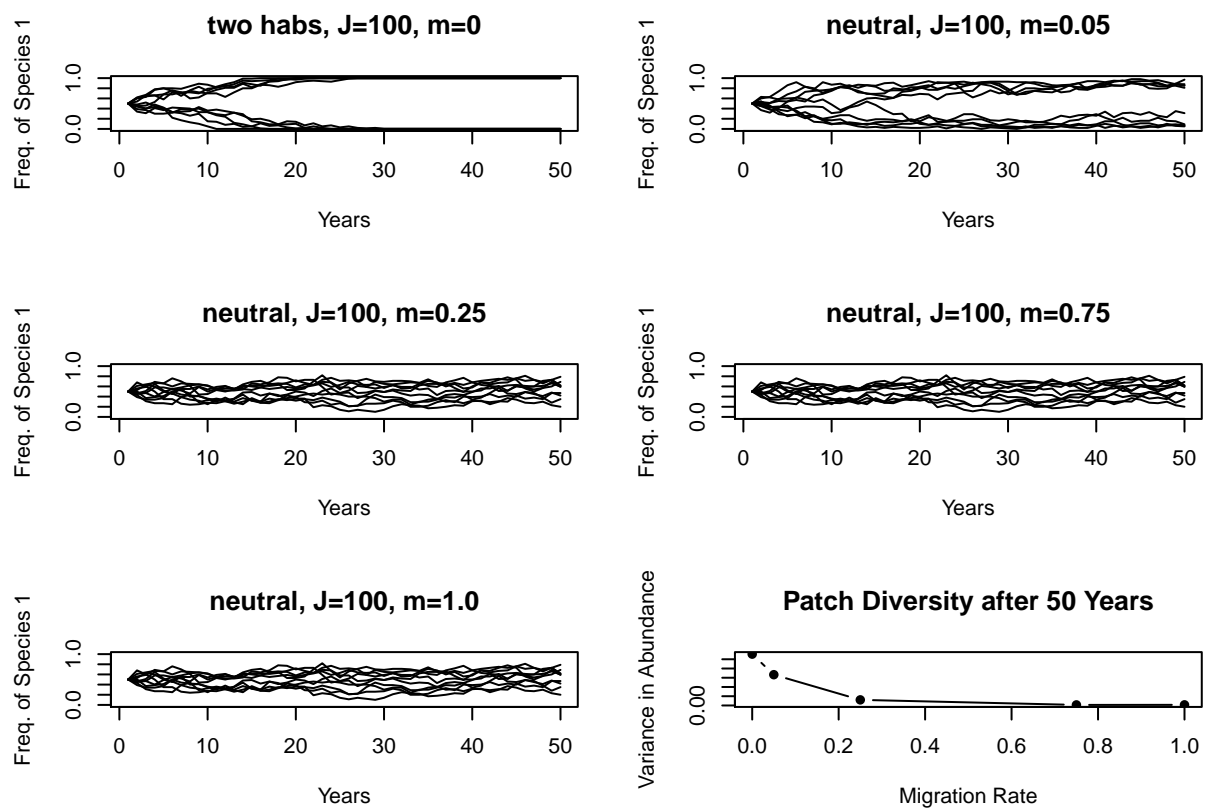
Figure 2: Interaction of Fitness and Migration

##How do