

Compare dxy of allopatric and sympatric species of piscivores and paedophages

Load package for plotting dots onto boxplot

```
require(beeswarm)
```

```
## Loading required package: beeswarm
```

Read in the dxy data of all pairwise comparisons of piscivores and paedophages

Note, the values of all chromosomes are listed as separate columns

```
dxy<-read.table("D:/Dropbox/victoriaGenomes/Dxy/pisci_paedo_allChr_dxy.txt",header=T)
```

Average across all sites of all chromosomes

```
## Compute the total number of pairwise differences across chromosomes
dxy$totalDiffs<-rowSums(dxy[,grepl(names(dxy),pattern="diffs")])

## Compute the total number of sites considered across chromosomes
dxy$totalCounts<-rowSums(dxy[,grepl(names(dxy),pattern="comparisons")])

## Compute dxy averaged across the entire genome
dxy$avg_dxy<-dxy$totalDiffs/dxy$totalCounts
```

Piscivores

```
## Get dxy values for comparisons within Lake Kyoga
pisci_Kyoga_dxy<-dxy[grepl(dxy$pop1,pattern="pisc_Kyoga")&
                    grepl(dxy$pop2,pattern="pisc_Kyoga"),]

## within the Southern parts of Lake Victoria (Mwanza/Speke Gulf)
pisci_Vic_dxy<-dxy[grepl(dxy$pop1,pattern="pisc_Victoria")&
                  grepl(dxy$pop2,pattern="pisc_Victoria"),]

## within the Northern parts of Lake Victoria at Uganda
pisci_Uganda_dxy<-dxy[(grepl(dxy$pop1,pattern="pisc_Vic_Uganda")&
                      grepl(dxy$pop2,pattern="pisc_Vic_Uganda")),]

## between Victoria South and Lake Kyoga
pisci_MwanKyog_dxy<-dxy[(grepl(dxy$pop1,pattern="pisc_Victoria")&
                        grepl(dxy$pop2,pattern="pisc_Kyo")) |
                      (grepl(dxy$pop1,pattern="pisc_Kyo")&
```

```

grepl(dxy$pop2,pattern="pisc_Victoria")),]

## between Victoria North and Lake Kyoga
pisci_UganKyog_dxy<-dxy[(grepl(dxy$pop1,pattern="pisc_Vic_Uganda")&
grepl(dxy$pop2,pattern="pisc_Kyo")) |
(grepl(dxy$pop1,pattern="pisc_Kyo")&
grepl(dxy$pop2,pattern="pisc_Vic_Uganda")),]

## between Victoria North and Victoria South
pisci_Uganda_Mwanza_dxy<-dxy[(grepl(dxy$pop1,pattern="pisc_Victoria")&
grepl(dxy$pop2,pattern="pisc_Vic_Uganda")) |
(grepl(dxy$pop1,pattern="pisc_Vic_Uganda")&
grepl(dxy$pop2,pattern="pisc_Victoria")),]

## Combine sympatric and allopatric piscivore contrasts
pisci_symp_dxy<-rbind(cbind(pisci_Kyoga_dxy,site="Kyoga"),
cbind(pisci_Vic_dxy,site="South Victoria"),
cbind(pisci_Uganda_dxy,site="North Victoria"))
pisci_allo_dxy<-rbind(cbind(pisci_MwanKyog_dxy,site="South Victoria Kyoga"),
cbind(pisci_UganKyog_dxy,site="North Victoria Kyoga"),
cbind(pisci_Uganda_Mwanza_dxy,site="Victoria"))

```

Paedophages

```

## extract values of dxy within Lake Kyoga
paedo_Kyoga_dxy<-dxy[grepl(dxy$pop1,pattern="paedo_Kyoga")&
grepl(dxy$pop2,pattern="paedo_Kyoga"),]

## extract values of dxy within Victoria South
paedo_Vic_dxy<-dxy[grepl(dxy$pop1,pattern="paedo_Vic")&
grepl(dxy$pop2,pattern="paedo_Vic"),]

## Combine sympatric contrasts
paedo_symp_dxy<-rbind(paedo_Kyoga_dxy,paedo_Vic_dxy)

## Get allopatric contrast, between Kyoga and Victoria
paedo_allo_dxy<-dxy[(grepl(dxy$pop1,pattern="paedo_Vic")&
grepl(dxy$pop2,pattern="paedo_Kyo")) |
(grepl(dxy$pop1,pattern="paedo_Kyo")&
grepl(dxy$pop2,pattern="paedo_Vic")),]

```

Plot allopatric versus sympatric dxy

make boxplots with overlaid dots using different symbols for different geographic region contrasts

```

# Prepare two panels for plotting piscivores and paedophages side by side
par(mfrow=c(1,2),mar=c(5,5,1,1),cex.lab=1.3)

```

```

# Draw boxplots of sympatric and allopatric piscivore dxy comparisons
boxplot(pisci_symp_dxy$avg_dxy,pisci_allo_dxy$avg_dxy,
        ylim=c(0.0015,0.003),names=c("sympatric","allopatric"),
        ylab=expression('D'['XY']*' piscivores'),col="white",outline=F)

# Overlay dots for each dxy comparison with symbols of different geographic regions
beeswarm(list(pisci_symp_dxy$avg_dxy,pisci_allo_dxy$avg_dxy),
        col="#FF9F00",add=T,
        pwpch=c(ifelse(pisci_symp_dxy$site=="Kyoga",4,
            ifelse(pisci_symp_dxy$site=="South Victoria",19,15)),
            ifelse(pisci_allo_dxy$site=="Victoria",17,
                ifelse(pisci_allo_dxy$site=="South Victoria Kyoga",6,8))))

# Add a legend
legend("top",col="#FF9F00",pch=c(19,15,4,17,6,8),
        legend=c("within South Victoria","within North Victoria",
            "within Kyoga","South vs North Victoria",
            "South Victoria vs Kyoga","North Victoria vs Kyoga"),
        bty="n",ncol=2)

# Boxplot of paedophages
boxplot(paedo_symp_dxy$avg_dxy,paedo_allo_dxy$avg_dxy,
        ylim=c(0.0015,0.003),names=c("sympatric","allopatric"),
        ylab=expression('D'['XY']*' paedophages'),col="white",outline=F)
beeswarm(list(paedo_symp_dxy$avg_dxy,paedo_allo_dxy$avg_dxy),
        col="#FF9F00",add=T,
        pwpch=c(ifelse(grepl(paedo_symp_dxy$pop1,pattern="Kyoga"),4,19),
            rep(6,times=length(paedo_allo_dxy$avg_dxy))))

```

