Univariate analyses of simplex output

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OVERVEW

This R Markdown document is designed to be opened and ran in the RStudio. The chunks of code below allow for univariate (i.e., x vs. y) relationships between variable in the output of **simplex** models.

SETUP

A. Clear and set the working directory

```
rm(list=ls())
getwd()
setwd("~/GitHub/simplex")
```

B. Import packages; install if needed

```
#install.packages("vegan")
require("vegan")
library(ggplot2)
```

C. Import custom modules of R functions

```
## Loading files with plotting and diversity functions
source("~/GitHub/simplex/tools/Rbin/metrics.R")
```

D. Import simulated data generated by simplex models

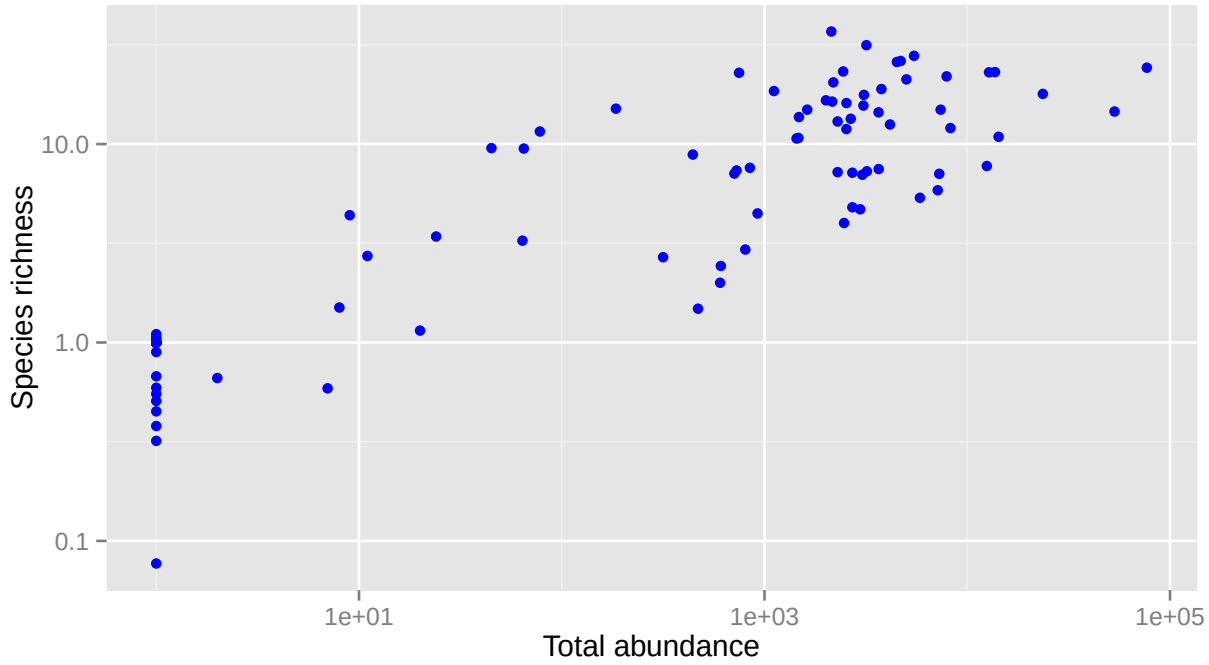
```
## Load Data
dat <- read.csv("~/GitHub/simplex/results/simulated_data/examples/SimData.csv")
ind.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/IndRTD.csv")
res.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/ResRTD.csv")
tracer.rtds <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/TracerRTD.csv")
species.list <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/Species.csv")
rads <- get.vectors("~/GitHub/simplex/results/simulated_data/examples/RADs.csv")
```

UNIVARIATE ANALYSES

1.) Does simplex produce realistic univariate relationships?

Let's begin by asking how species richness (S) and species evenness relate to total abundance (N). Usually, we would expect to find greater numbers of species when sampling greater numbers of individuals, i.e., a positive relationship between N and S. Do simplex models generally conform to this simple prediction? What other simple or straightforward relationships should we expect to find?

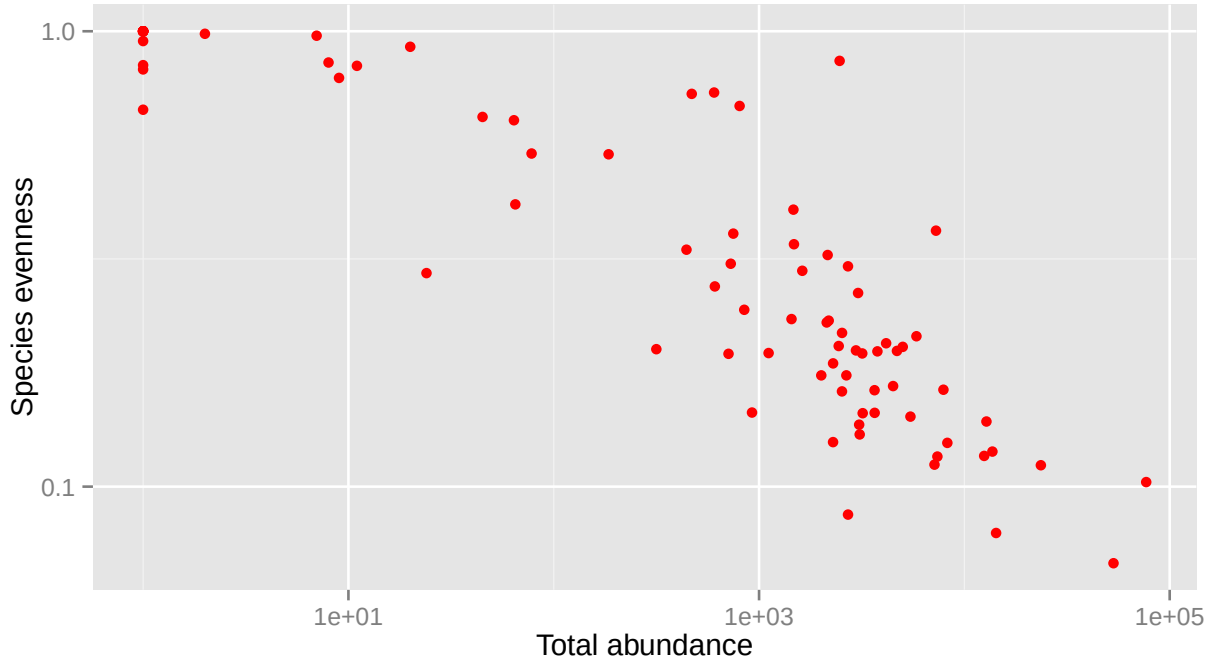
```
N <- dat$total.abundance[dat$total.abundance<=0] <- 1
S <- dat$species.richness[dat$species.richness<=0] <- 1

ggplot(dat, aes(x=dat$total.abundance, y=dat$species.richness)) +
  geom_point(colour="blue") +
  scale_x_log10() +
  scale_y_log10() +
  labs(x= "Total abundance", y="Species richness")
```



2.) Graphical exploration: What lesser known relationships does simplex suggest we should observe?

We might also expect to find that species evenness decreases with N, i.e., larger ecological communities have a less equitable distribution of abundance. Do simplex models produce these relationships?

```
ggplot(dat, aes(x=dat$total.abundance, y=dat$e.var)) +
  geom_point(colour="red") +
  scale_x_log10() +
  scale_y_log10() +
  labs(x= "Total abundance", y="Species evenness")
```


1.0
0.1
Species evenness
1e+01
1e+03
1e+05
Total abundance