Running 4-species food web in Ives et al. 2003 in package tvvarss

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Installation

```
library(devtools)
devtools:::install_github("eric-ward/tvvarss")
```

```
library(rstan)
library(tvvarss)
# for optimizing stan on your machine,
rstan_options(auto_write = TRUE)
options(mc.cores = parallel::detectCores())
```

Data

```
library(MARSS)
data(ivesDataByWeek)
ivesDataByWeek = as.data.frame(ivesDataByWeek)
# filter months 17 - 38
ivesDataByWeek = ivesDataByWeek[which(ivesDataByWeek$`Year week` %in% seq(17,37)),]
# data from west long lake (low planktivory)
spp = c("Large Phyto", "Small Phyto", "Daphnia", "Non-daphnia")
dat = ivesDataByWeek[,spp]

# log transform
dat = as.matrix(log(dat))
```

```
vecY = c(dat)
set.seed(100)

test_ind = matrix(0, nrow(dat), ncol(dat))
# sample observations for each spp separately
for(i in 1:ncol(dat)) {
  pos = as.numeric(which(!is.na(dat[,i])))
  test_ind[sample(pos, size=round(0.1*length(pos)), replace=F),i] = 1
}
test_ind = seq(1,ncol(dat)*nrow(dat))[which(test_ind==1)]

training_data = vecY
training_data[test_ind] = NA
training_data = matrix(training_data, ncol=ncol(dat))

test_data = vecY
test_data[-test_ind] = NA
test_data = matrix(test_data, ncol=ncol(dat))
```

Estimates

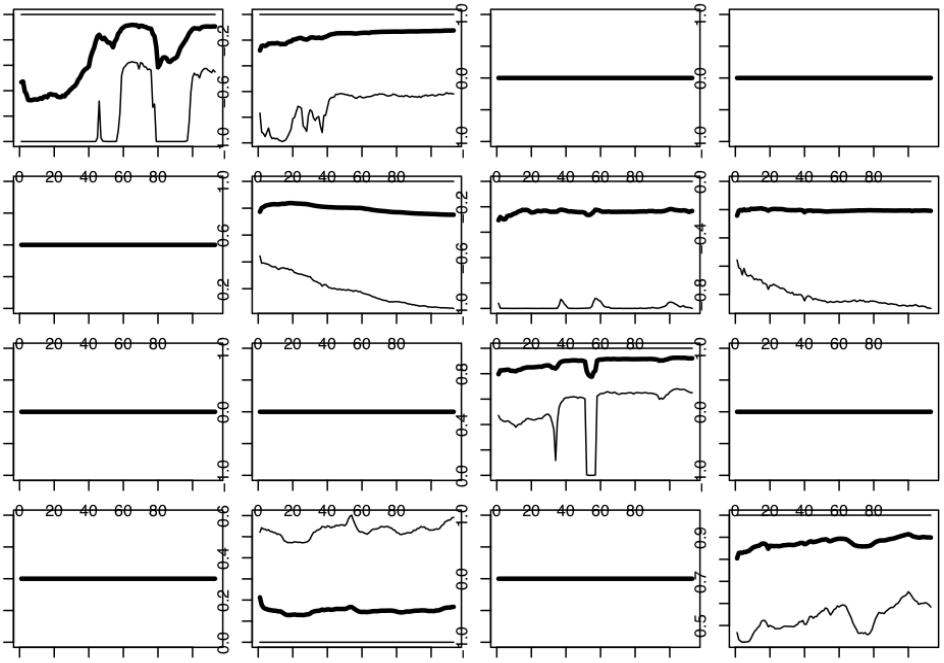

Figure 1: Estimated B matrix of Ives et al. 2003

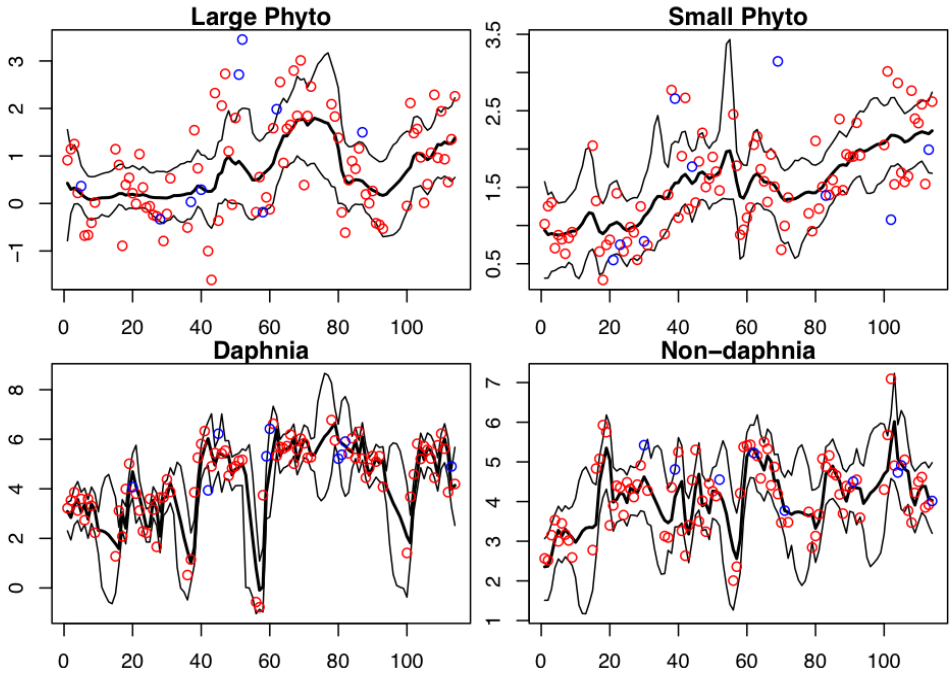

Figure 2: Model fitted values (line) and training (red) and test (blue) data sets.

Validation

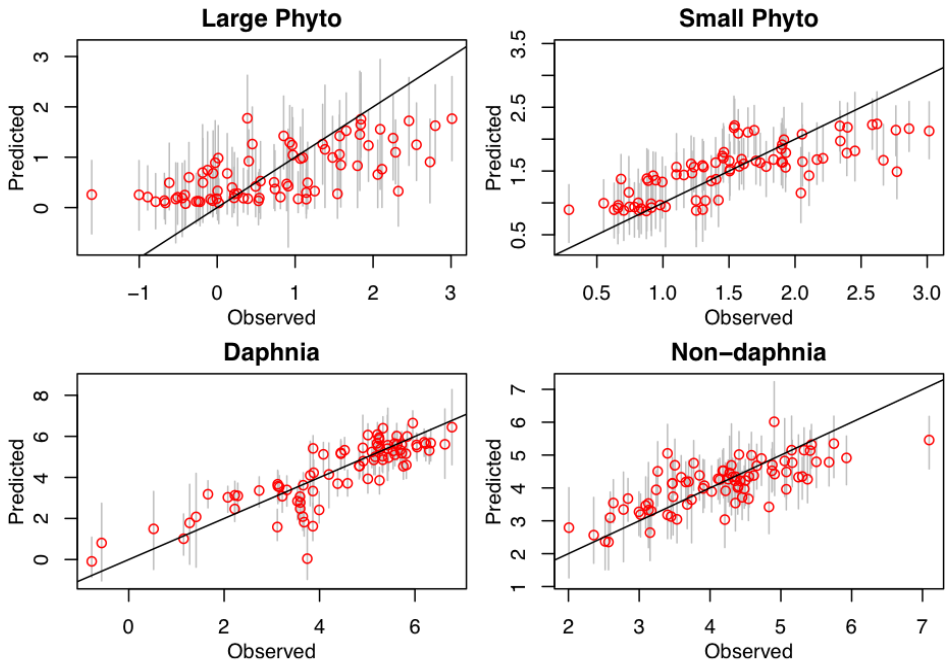

Figure 3: Observed (training data) vs. Predicted

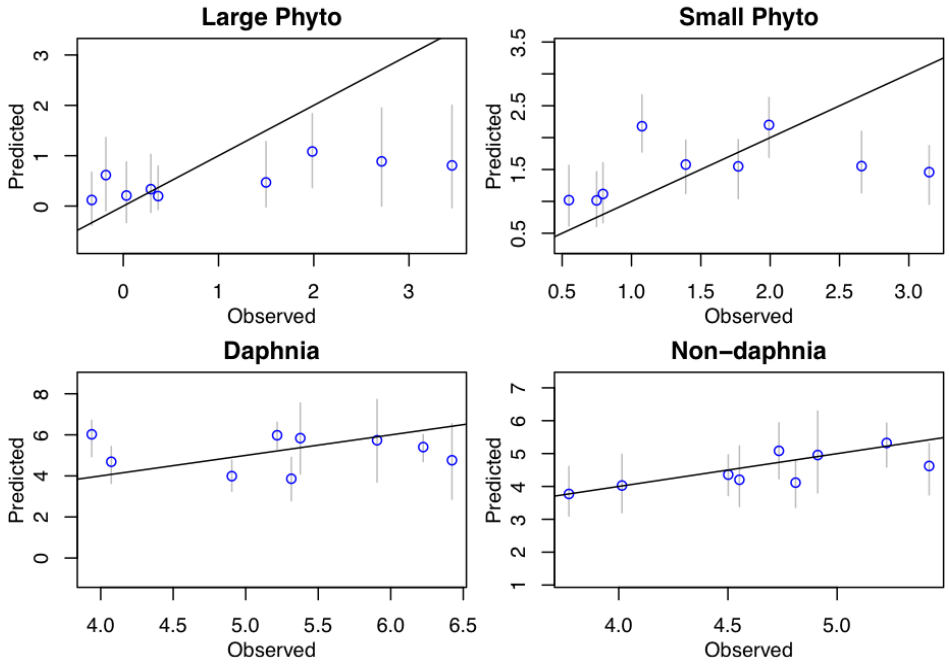

Figure 4: Predicted vs Observed (test data)