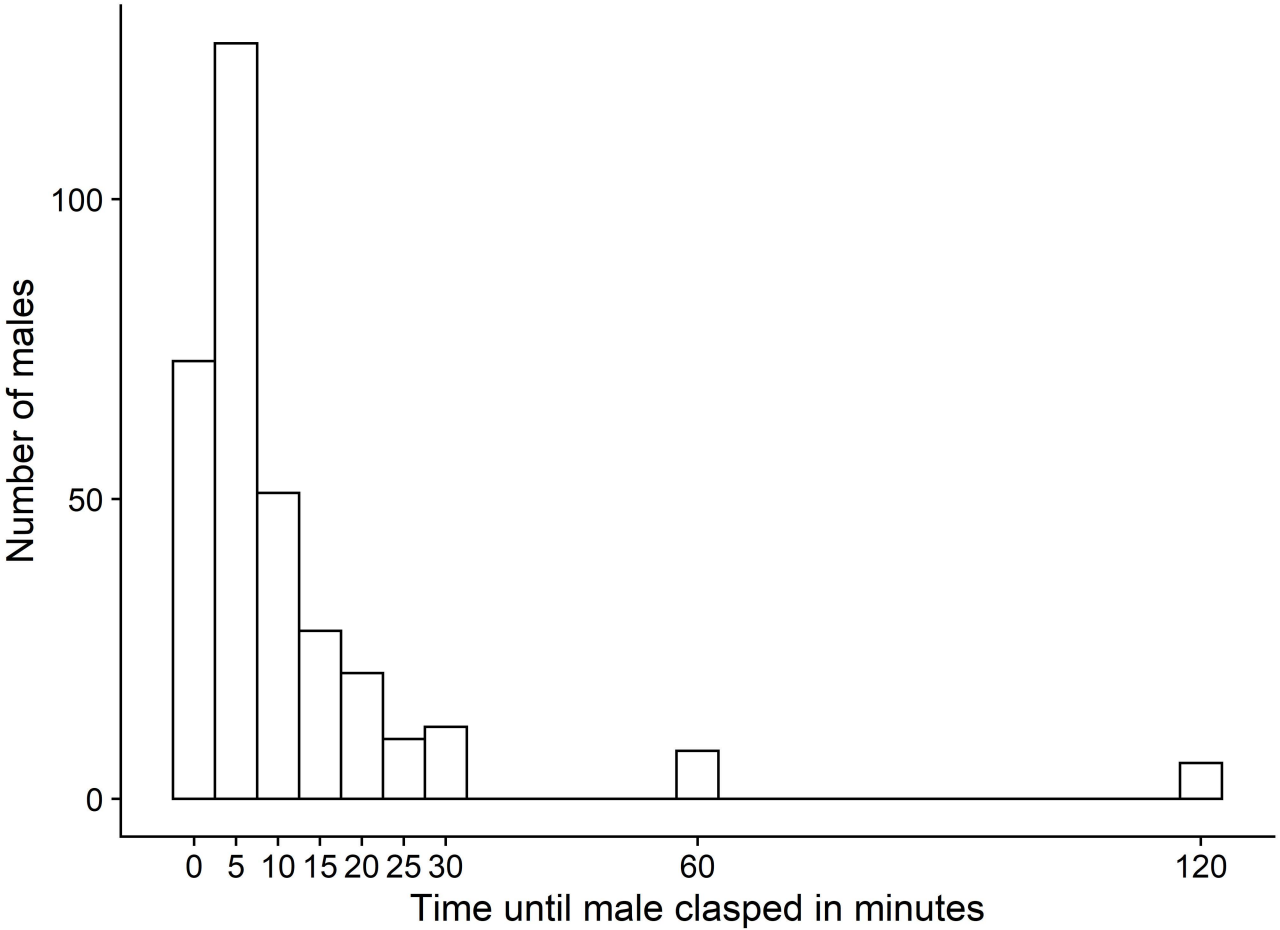

A
3
4
5
6


B
5
6
7
8
9


C
6
7
8
9


Number of males
100
50
0
0
5
10
15
20
25
30
60
120
Time until male clasped in minutes

```
###Mate Color Choice####
library(ggpubr)
library(cowplot)
theme_set(theme_cowplot())
library(nnet)

#Data files needed:
#"Trypsin Val Data.csv", to analyze male preference for size when treated with trypsin
#"color Choice Data.csv", to analyze effect of color on clasping and to plot histogram of male clasp time
#"Color Choice Totals.csv", to plot male choice data
#"Trypsin Val Totals.csv", to plot male preference for stage when treated with trypsin



##################### STart Plotting of results ###################################
#Plot bar graphs with totals for each group

#subset group totals out from groups organized by male
colortots = read.csv("Color Choice Totals.csv")
colortots$Female = relevel(colortots$Female, ref = "White")
table(colortots$Female)

#All male data in each group
#Leave odd spacing alone in scale_x_discrete code. It matches up when drawn out.

p1<-ggplot(data=colortots, aes(x=Group, y=percent, fill=Female, label = clasped)) +
 geom_bar(stat="identity")+
 geom_text(size=6, position = position_stack(vjust=0.5), color="white")+
 scale_fill_manual("Female Clasped:", values=c('#999999','#666666', '#000000'))+
 ylab("Percentage of Male Choices") +
```

```
  theme(axis.text.x = element_text(size=13))+
  theme(axis.text.y = element_text(size=13))+
  theme(axis.title.y = element_text(size=15))+
  theme(axis.title.x = element_blank())+
  theme(legend.text = element_text(size=13))+
  theme(legend.position = c(0.28,0.98), legend.direction = "horizontal")+
  scale_x_discrete(labels=c("Wild-type red vstiff(file = "Fig 4 main groups.tiff", units = "in", width = 7.5,
height = 7.5, res = 600)
p1
dev.off()
white (trypsin)", "Wild-type red vs
white (untreated)",
                    "Restored-red vs
white (trypsin)", "Restored-red vs
white (untreated)"))
p1



tiff(file = "Fig III main groups low res.tiff", units = "in", width = 7.5, height = 7.5, res = 100)
p1
dev.off()

##Trypsin size choice test
#Import data totals for graphing
trypvaltots = read.csv("Trypsin Val Totals.csv")

#Build plot and export to tiff file
p2<-ggplot(data=trypvaltots, aes(x=Trypsin, y=percent, fill=female, label=clasped)) +
```

```
  geom_bar(stat="identity")+
  geom_text(size=6, position = position_stack(vjust=0.5), color="white")+
  scale_fill_manual("Female clasped:",values=c('#999999','#666666', '#000000'))+
  ylab("Percentage of Male Choices") +
  theme(axis.text.x = element_text(size=13))+
  theme(axis.text.y = element_text(size=13))+
  theme(axis.title.y = element_text(size=13))+
  theme(axis.title.x = element_blank())+
  theme(legend.text = element_text(size=11), legend.position = c(0.05,0.99), legend.direction =
"horizontal")
p2

tiff(file = "Fig 3 trypsin val totals.tiff", units = "in", width = 5.0, height = 5.5, res = 600)
p2
dev.off()

tiff(file = "Fig 3 trypsin val totals low res.tiff", units = "in", width = 5.0, height = 5.5, res = 100)
p2
dev.off()


#histogram of how long it took males to clasp females
p0 <- ggplot(color, aes(x=TimeClasped)) +
  geom_histogram(binwidth=5, color="black", fill="white")+
  scale_x_continuous(breaks = c(0,5,10,15,20,25,30,60,120))+
  xlab("Time until male clasped in minutes")+
  ylab("Number of males")
p0
```

```
tiff(file = "Fig SII.tiff", units = "in", width = 6.8, height = 5.0, res = 600)
p0
dev.off()

tiff(file = "Fig SII low res.tiff", units = "in", width = 6.8, height = 5.0, res = 100)
p0
dev.off()

################## End plotting and start modeling ####################


####Are there significant differences in the number of red and clear females chosen within a treatment group?####

#Read in data and check that variables are in correct format
color=read.csv("Color Choice Data.csv")
str(color)

###Subsetting###
#Droplevels used to reset categorical factors to appropriate level values after subset
#Algae data.frame
colorA=color[1:184,]
colorA = droplevels(colorA)

#Zeaxanthin data.frame
colorZ=color[185:335,]
colorZ = droplevels(colorZ)

algaeuntreat = color[1:88,]
```

```
algaeuntreat = droplevels(algaeuntreat)

algaetreat = color[89:184,]
algaetreat = droplevels(algaetreat)

zeauntreat = color[185:259,]
zeauntreat = droplevels(zeauntreat)

zeatreat = color[260:335,]
zeatreat = droplevels(zeatreat)

###mULTINOMIAL COLOR CHOICE MODELS

##Wild type red untreated
#Compare wild type red and clear to no choice as reference
algaeuntreat$female = relevel(algaeuntreat$female, ref = "Y")
AUtest <- multinom(female~1, data = algaeuntreat)
summary(AUtest)
exp(coef(AUtest))
exp(confint(AUtest))

##wildtype red treated
#Compare wild type red and clear to no choice as reference
algaetreat$female = relevel(algaetreat$female, ref="Y")
ATtest <- multinom(female~1, data=algaetreat)
summary(ATtest)
exp(coef(ATtest))
exp(confint(ATtest))
```

```
##Restored red untreated

#compare restored red and clear to no choice as reference

zeauntreat$female = relevel(zeauntreat$female, ref = "Y")

ZUtest <- multinom(female~1, data=zeauntreat)

summary(ZUtest)

exp(coef(ZUtest))

exp(confint(ZUtest))


##Restored red treated

#compare restored red and clear to no choice as reference

zeatreat$female = relevel(zeatreat$female, ref = "Y")

ZTtest <- multinom(female~1, data=zeatreat)

summary(ZTtest)

exp(coef(ZTtest))

exp(confint(ZTtest))
```

```
######################## Analysis of Trypsin Validation Data ###################################
```

#Are there significat differences between the number of large and small pods chosen between a treatment group?

```
#Subset trypdatum dataset into treated and untreated groups, then drop levels of data frames

tryptreat = trypdatum[40:80,]

tryptreat = droplevels(tryptreat)

trypuntreat = trypdatum[1:39,]
```

```
trypuntreat = droplevels(trypuntreat)

###Untreated group
#Compare the likelihood of clasping large and making no choice to clasping small females
Utest = multinom(female~1, data = trypuntreat)
summary(Utest)

exp(coef(Utest))
exp(confint(Utest))

zUtest <- summary(Utest)$coefficients/summary(Utest)$standard.errors
zUtest

pUtest <- (1 - pnorm(abs(zUtest), 0, 1)) * 2
pUtest

#Compare the likelihood of clasping large or small to making no choice
trypuntreat$female = relevel(trypuntreat$female, ref="0")
Utest2 = multinom(female~1, data = trypuntreat)
summary(Utest2)

exp(coef(Utest2))
exp(confint(Utest2))

zUtest2 <- summary(Utest2)$coefficients/summary(Utest2)$standard.errors
zUtest2

pUtest2 <- (1 - pnorm(abs(zUtest2), 0, 1)) * 2
pUtest2
```

```
###Treated group
#Compare the likelihood of clasping large and making no choice to clasping small females
Ttest = multinom(female~1, data = tryptreat)
summary(Ttest)

exp(coef(Ttest))
exp(confint(Ttest))

zTtest <- summary(Ttest)$coefficients/summary(Ttest)$standard.errors
zTtest

pTtest <- (1 - pnorm(abs(zTtest), 0, 1)) * 2
pTtest

#Compare the likelihood of clasping large or small to making no choice
tryptreat$female = relevel(tryptreat$female, ref="0")
Ttest2 = multinom(female~1, data = tryptreat)
summary(Ttest2)

exp(coef(Ttest2))
exp(confint(Ttest2))

zTtest2 <- summary(Ttest2)$coefficients/summary(Ttest2)$standard.errors
zTtest2

pTtest2 <- (1 - pnorm(abs(zTtest2), 0, 1)) * 2
pTtest2
```

Date	ID	Food	L	W	EstArea	
11/30/17	T_Y_A1_113017	Yeast	0.634	0.295	0.18703	
11/30/17	T_Y_A2_113017	Yeast	0.637	0.274	0.174538	
11/30/17	T_Y_A3_113017	Yeast	0.734	0.312	0.229008	
11/30/17	T_Y_A4_113017	Yeast	0.702	0.297	0.208494	
11/30/17	T_Y_A5_113017	Yeast	0.568	0.286	0.162448	
11/30/17	T_Y_A6_113017	Yeast	0.796	0.331	0.263476	
11/30/17	T_Y_B1_113017	Yeast	0.623	0.296	0.184408	
11/30/17	T_Y_B2_113017	Yeast	0.952	0.383	0.364616	
11/30/17	T_Z_C1_113017	Zeaxanthin	0.694	0.29	0.20126	
11/30/17	T_Z_C2_113017	Zeaxanthin	0.684	0.316	0.216144	
11/30/17	T_Z_C3_113017	Zeaxanthin	0.58	0.238	0.13804	
11/30/17	T_Z_C4_113017	Zeaxanthin	0.561	0.257	0.144177	
11/30/17	T_Z_C5_113017	Zeaxanthin	0.675	0.279	0.188325	
11/30/17	T_Z_C6_113017	Zeaxanthin	0.609	0.246	0.149814	
11/30/17	T_Z_D1_113017	Zeaxanthin	0.57	0.253	0.14421	
11/30/17	T_Z_D2_113017	Zeaxanthin	0.549	0.248	0.136152	
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm

12/06/17	C_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Z_120617	Zeaxanthin	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/06/17	T_Y_120617	Yeast	n/a	n/a	n/a	First trial. Matched by estimated size just like Palm
12/12/17	C_Z_A1_121217	Zeaxanthin	0.938	0.37	0.34706	
12/12/17	C_Z_A2_121217	Zeaxanthin	0.83	0.321	0.26643	
12/12/17	C_Z_A3_121217	Zeaxanthin	0.626	0.288	0.180288	
12/12/17	C_Z_A4_121217	Zeaxanthin	0.799	0.326	0.260474	
12/12/17	C_Z_A5_121217	Zeaxanthin	0.591	0.253	0.149523	
12/12/17	C_Z_A6_121217	Zeaxanthin	0.544	0.198	0.107712	
12/12/17	C_Y_C1_121217	Yeast	0.604	0.263	0.158852	
12/12/17	C_Y_C2_121217	Yeast	0.75	0.318	0.2385	
12/12/17	C_Y_C3_121217	Yeast	0.664	0.288	0.191232	
12/12/17	C_Y_C4_121217	Yeast	0.658	0.301	0.198058	
12/12/17	C_Y_C5_121217	Yeast	0.681	0.283	0.192723	
12/12/17	C_Y_C6_121217	Yeast	0.574	0.265	0.15211	
01/26/18	C_Y_A1_012618	Yeast	0.94	0.36	0.3384	
01/26/18	C_Y_A2_012618	Yeast	0.84	0.313	0.26292	
01/26/18	C_Y_A3_012618	Yeast	0.785	0.306	0.24021	

01/26/18	C_Y_A4_012618	Yeast	0.777	0.289	0.224553
01/26/18	C_Y_A5_012618	Yeast	0.776	0.314	0.243664
01/26/18	C_Z_C1_012618	Zeaxanthin	0.87	0.35	0.3045
01/26/18	C_Z_C2_012618	Zeaxanthin	0.885	0.318	0.28143
01/26/18	C_Z_C3_012618	Zeaxanthin	0.87	0.341	0.29667
01/26/18	C_Z_C4_012618	Zeaxanthin	0.917	0.335	0.307195
01/26/18	C_Z_C5_012618	Zeaxanthin	0.948	0.373	0.353604
02/08/2018	C_A_A1_020818	Algae	0.653	0.272	0.177616
02/08/2018	C_A_A2_020818	Algae	0.794	0.32	0.25408
02/08/2018	C_A_A3_020818	Algae	0.693	0.309	0.214137
02/08/2018	C_A_A4_020818	Algae	0.724	0.329	0.238196
02/08/2018	C_A_A5_020818	Algae	0.698	0.291	0.203118
02/08/2018	C_A_A6_020818	Algae	0.707	0.296	0.209272
02/08/2018	C_A_B1_020818	Algae	0.913	0.369	0.336897
02/08/2018	C_A_B2_020818	Algae	0.72	0.313	0.22536
02/08/2018	C_A_B3_020818	Algae	0.874	0.366	0.319884
02/08/2018	C_A_B4_020818	Algae	0.699	0.307	0.214593
02/08/2018	C_A_B5_020818	Algae	0.712	0.305	0.21716
02/08/2018	C_A_B6_020818	Algae	0.834	0.353	0.294402
02/08/2018	C_Y_C1_020818	Yeast	0.739	0.305	0.225395
02/08/2018	C_Y_C2_020818	Yeast	0.68	0.316	0.21488
02/08/2018	C_Y_C3_020818	Yeast	0.679	0.312	0.211848
02/08/2018	C_Y_C4_020818	Yeast	0.687	0.293	0.201291
02/08/2018	C_Y_C5_020818	Yeast	0.627	0.257	0.161139
02/08/2018	C_Y_C6_020818	Yeast	0.912	0.357	0.325584
02/08/2018	C_Y_D1_020818	Yeast	0.55	0.249	0.13695
02/08/2018	C_Y_D2_020818	Yeast	0.7	0.322	0.2254
02/08/2018	C_Y_D3_020818	Yeast	0.557	0.222	0.123654
02/08/2018	C_Y_D4_020818	Yeast	0.667	0.296	0.197432
02/08/2018	C_Y_D5_020818	Yeast	0.858	0.369	0.316602
02/08/2018	C_Y_D6_020818	Yeast	0.886	0.354	0.313644
2/9/2018	C_Y_C1_020918	Yeast	0.708	0.297	0.210276

2/9/2018	C_Y_C2_020918	Yeast	0.608	0.279	0.169632
2/9/2018	C_Y_C3_020918	Yeast	0.766	0.315	0.24129
2/9/2018	C_Y_C4_020918	Yeast	0.649	0.287	0.186263
2/9/2018	C_Y_C5_020918	Yeast	0.86	0.34	0.2924
2/9/2018	C_Y_C6_020918	Yeast	0.857	0.32	0.27424
2/9/2018	C_A_A1_020918	Algae	0.627	0.255	0.159885
2/9/2018	C_A_A2_020918	Algae	0.53	0.244	0.12932
2/9/2018	C_A_A3_020918	Algae	0.745	0.325	0.242125
2/9/2018	C_A_A4_020918	Algae	0.908	0.374	0.339592
2/9/2018	C_A_A5_020918	Algae	0.715	0.324	0.23166
2/9/2018	C_A_A6_020918	Algae	0.687	0.301	0.206787
2/15/2018	C_Y_A1_021518	Yeast	0.636	0.305	0.19398
2/15/2018	C_Y_A2_021518	Yeast	0.705	0.296	0.20868
2/15/2018	C_Y_A3_021518	Yeast	0.553	0.267	0.147651
2/15/2018	C_Y_A4_021518	Yeast	0.563	0.273	0.153699
2/15/2018	C_Y_A5_021518	Yeast	0.838	0.337	0.282406
2/15/2018	C_Y_A6_021518	Yeast	0.656	0.286	0.187616
2/15/2018	C_Z_C1_021518	Zeaxanthin	0.701	0.251	0.175951
2/15/2018	C_Z_C2_021518	Zeaxanthin	0.749	0.29	0.21721
2/15/2018	C_Z_C3_021518	Zeaxanthin	0.894	0.381	0.340614
2/15/2018	C_Z_C4_021518	Zeaxanthin	1.078	0.396	0.426888
2/15/2018	C_Z_C5_021518	Zeaxanthin	0.829	0.335	0.277715
2/15/2018	C_Z_C6_021518	Zeaxanthin	1.028	0.381	0.391668
2/15/2018	C_Z_D1_021518	Zeaxanthin	0.807	0.34	0.27438
2/18/2018	C_Y_A1_021818	Yeast	0.78	0.274	0.21372
2/18/2018	C_Y_A2_021818	Yeast	0.728	0.294	0.214032
2/18/2018	C_Y_A3_021818	Yeast	0.679	0.293	0.198947
2/18/2018	C_Y_A4_021818	Yeast	0.786	0.322	0.253092
2/18/2018	C_Y_A5_021818	Yeast	0.803	0.324	0.260172
2/18/2018	C_Y_A6_021818	Yeast	0.716	0.292	0.209072
2/18/2018	C_Y_B1_021818	Yeast	0.756	0.287	0.216972
2/18/2018	C_Y_B2_021818	Yeast	0.727	0.297	0.215919

2/18/2018	C_Y_B4_021818	Yeast	0.738	0.318	0.234684
2/18/2018	C_Y_B5_021818	Yeast	0.653	0.301	0.196553
2/18/2018	C_Z_C1_021818	Zeaxanthin	1.05	0.387	0.40635
2/18/2018	C_Z_C2_021818	Zeaxanthin	1.014	0.391	0.396474
2/18/2018	C_Z_C3_021818	Zeaxanthin	0.817	0.298	0.243466
2/18/2018	C_Z_C4_021818	Zeaxanthin	1.062	0.388	0.412056
2/18/2018	C_Z_C5_021818	Zeaxanthin	0.794	0.323	0.256462
2/18/2018	C_Z_C6_021818	Zeaxanthin	0.87	0.339	0.29493
2/18/2018	C_Z_D1_021818	Zeaxanthin	0.859	0.342	0.293778
2/18/2018	C_Z_D2_021818	Zeaxanthin	0.785	0.311	0.244135
2/18/2018	C_Z_D3_021818	Zeaxanthin	0.995	0.39	0.38805
2/18/2018	C_Z_D4_021818	Zeaxanthin	0.906	0.381	0.345186
2/22/18	C_Y_A1_022218	Yeast	0.737	0.271	0.199727
2/22/18	C_Y_A2_022218	Yeast	0.682	0.266	0.181412
2/22/18	C_Y_A3_022218	Yeast	0.584	0.245	0.14308
2/22/18	C_Y_A4_022218	Yeast	0.669	0.274	0.183306
2/22/18	C_Y_A5_022218	Yeast	0.719	0.284	0.204196
2/22/18	C_Y_A6_022218	Yeast	0.649	0.256	0.166144
2/22/18	C_Y_B1_022218	Yeast	0.795	0.291	0.231345
2/22/18	C_Y_B2_022218	Yeast	0.635	0.262	0.16637
2/22/18	C_Z_C_022218	Zeaxanthin	0.785	0.307	0.240995
2/22/18	C_Z_C2_022218	Zeaxanthin	0.695	0.277	0.192515
2/22/18	C_Z_C3_022218	Zeaxanthin	0.824	0.334	0.275216
2/22/18	C_Z_C4_022218	Zeaxanthin	0.854	0.332	0.283528
2/22/18	C_Z_C5_022218	Zeaxanthin	0.643	0.295	0.189685
2/22/18	C_Z_C6_022218	Zeaxanthin	0.631	0.252	0.159012
2/22/18	C_Z_D1_022218	Zeaxanthin	0.75	0.311	0.23325
2/24/18	C_A_A1_022418	Algae	0.748	0.291	0.217668
2/24/18	C_A_A2_022418	Algae	0.668	0.315	0.21042
2/24/18	C_A_A3_022418	Algae	0.658	0.298	0.196084
2/24/18	C_A_A4_022418	Algae	0.681	0.299	0.203619
2/24/18	C_A_A5_022418	Algae	0.763	0.302	0.230426

2/24/18	C_A_A6_022418	Algae	0.89	0.359	0.31951
2/24/18	C_Z_B1_022418	Zeaxanthin	0.592	0.243	0.143856
2/24/18	C_Z_B2_022418	Zeaxanthin	0.642	0.259	0.166278
2/24/18	C_Z_B3_022418	Zeaxanthin	0.682	0.29	0.19778
2/24/18	C_Z_B4_022418	Zeaxanthin	0.638	0.28	0.17864
2/24/18	C_Z_B5_022418	Zeaxanthin	0.653	0.28	0.18284
2/24/18	C_Y_B6_022418	Yeast	0.65	0.265	0.17225
2/24/18	C_Y_C1_022418	Yeast	0.634	0.284	0.180056
2/24/18	C_Y_C2_022418	Yeast	0.652	0.299	0.194948
2/24/18	C_Y_C3_022418	Yeast	0.658	0.298	0.196084
2/24/18	C_Y_C4_022418	Yeast	0.623	0.272	0.169456
2/24/18	C_Y_C5_022418	Yeast	0.664	0.286	0.189904
2/24/18	C_Y_C6_022418	Yeast	0.655	0.282	0.18471
2/24/18	C_Y_D1_022418	Yeast	0.635	0.278	0.17653
2/24/18	C_Y_D2_022418	Yeast	0.669	0.289	0.193341
2/24/18	C_Y_D3_022418	Yeast	0.641	0.251	0.160891
2/24/18	C_Y_D4_022418	Yeast	0.662	0.28	0.18536
2/24/18	C_Y_D5_022418	Yeast	0.644	0.279	0.179676
2/28/18	C_A_A1_022818	Algae	0.999	0.392	0.391608
2/28/18	C_A_A2_022818	Algae	0.765	0.364	0.27846
2/28/18	C_A_A3_022818	Algae	0.874	0.296	0.258704
2/28/18	C_A_A4_022818	Algae	0.993	0.404	0.401172
2/28/18	C_A_A5_022818	Algae	0.86	0.332	0.28552
2/28/18	C_A_A6_022818	Algae	0.955	0.391	0.373405
2/28/18	C_Y_B1_022818	Yeast	0.639	0.257	0.164223
2/28/18	C_Y_B2_022818	Yeast	0.907	0.349	0.316543
2/28/18	C_Y_B3_022818	Yeast	0.67	0.26	0.1742
2/28/18	C_Y_B4_022818	Yeast	0.849	0.349	0.296301
2/28/18	C_Y_B5_022818	Yeast	0.692	0.262	0.181304
2/28/18	C_Y_B6_022818	Yeast	0.816	0.337	0.274992
2/28/18	C_Y_C1_022818	Yeast	0.709	0.29	0.20561
3/14/18	C_Z_A1_031418	Yeast	0.642	0.273	0.175266

3/14/18	C_Z_A2_031418	Yeast	0.67	0.299	0.20033
3/14/18	C_Z_A3_031418	Yeast	0.678	0.299	0.202722
3/14/18	C_Z_A4_031418	Yeast	0.677	0.305	0.206485
3/14/18	C_Z_A5_031418	Yeast	0.67	0.296	0.19832
3/14/18	C_Z_A6_031418	Yeast	0.689	0.292	0.201188
3/14/18	C_Z_B1_031418	Yeast	0.73	0.319	0.23287
3/14/18	C_Z_B2_031418	Yeast	0.674	0.286	0.192764
3/14/18	C_Z_B3_031418	Yeast	0.7	0.307	0.2149
3/14/18	C_Y_C1_031418	Yeast	0.596	0.248	0.147808
3/14/18	C_Y_C2_031418	Yeast	0.615	0.281	0.172815
3/14/18	C_Y_C3_031418	Yeast	0.643	0.286	0.183898
3/14/18	C_Y_C4_031418	Yeast	0.65	0.291	0.18915
3/14/18	C_Y_C5_031418	Yeast	0.606	0.268	0.162408
3/14/18	C_Y_C6_031418	Yeast	0.654	0.288	0.188352
3/14/18	C_Y_D1_031418	Yeast	0.669	0.264	0.176616
3/14/18	C_Y_D2_031418	Yeast	0.616	0.275	0.1694
3/30/18	C_Y_A1_033018	Yeast	0.895	0.341	0.305195
3/30/18	C_Y_A2_033018	Yeast	0.771	0.317	0.244407
3/30/18	C_Y_A3_033018	Yeast	0.723	0.305	0.220515
3/30/18	C_Y_A4_033018	Yeast	0.89	0.365	0.32485
3/30/18	C_Y_A5_033018	Yeast	0.744	0.307	0.228408
3/30/18	C_Y_A6_033018	Yeast	0.959	0.362	0.347158
3/30/18	C_A_C1_033018	Algae	0.705	0.311	0.219255
3/30/18	C_A_C2_033018	Algae	0.75	0.295	0.22125
3/30/18	C_A_C3_033018	Algae	0.707	0.276	0.195132
3/30/18	C_A_C4_033018	Algae	0.698	0.28	0.19544
3/30/18	C_A_C5_033018	Algae	0.662	0.315	0.20853
3/30/18	C_A_C6_033018	Algae	0.882	0.365	0.32193
3/30/18	C_A_D1_033018	Algae	0.617	0.25	0.15425
3/30/18	C_A_D2_033018	Algae	0.593	0.235	0.139355
3/30/18	C_A_D3_033018	Algae	0.661	0.307	0.202927
04/06/18	C_A_C1_040618	Algae	0.717	0.298	0.213666

04/06/18	C_A_C2_040618	Algae	0.633	0.273	0.172809
04/06/18	C_A_C3_040618	Algae	0.774	0.286	0.221364
04/06/18	C_A_C4_040618	Algae	0.734	0.286	0.209924
04/06/18	C_A_C5_040618	Algae	0.58	0.249	0.14442
04/06/18	C_A_C6_040618	Algae	0.466	0.197	0.091802
04/06/18	C_A_D1_040618	Algae	0.706	0.286	0.201916
04/06/18	C_A_D2_040618	Algae	0.585	0.224	0.13104
04/06/18	C_A_D3_040618	Algae	0.576	0.257	0.148032
04/06/18	C_A_D4_040618	Algae	0.558	0.219	0.122202
04/06/18	C_A_D5_040618	Algae	0.602	0.24	0.14448
04/06/18	C_Y_A1_040618	Algae	0.971	0.384	0.372864
04/06/18	C_Y_A2_040618	Algae	0.75	0.308	0.231
04/06/18	C_Y_A3_040618	Algae	0.783	0.306	0.239598
04/06/18	C_Y_A4_040618	Algae	0.86	0.312	0.26832
04/06/18	C_Y_A5_040618	Algae	0.679	0.259	0.175861
04/06/18	C_Y_A6_040618	Algae	0.767	0.317	0.243139
04/06/18	C_Y_B1_040618	Algae	0.838	0.321	0.268998
04/06/18	C_Y_B2_040618	Algae	0.796	0.306	0.243576
05/05/18	C_A_A1_050518	Algae	0.701	0.286	0.200486
05/05/18	C_A_A2_050518	Algae	0.586	0.257	0.150602
05/05/18	C_A_A3_050518	Algae	0.716	0.278	0.199048
05/05/18	C_A_A4_050518	Algae	0.757	0.322	0.243754
05/05/18	C_A_A5_050518	Algae	0.71	0.313	0.22223
05/05/18	C_A_A6_050518	Algae	0.657	0.291	0.191187
05/05/18	C_A_B1_050518	Algae	0.852	0.37	0.31524
05/05/18	C_A_B2_050518	Algae	0.726	0.294	0.213444
05/05/18	C_A_B3_050518	Algae	0.747	0.313	0.233811
05/05/18	C_A_B4_050518	Algae	0.685	0.267	0.182895
05/05/18	C_Y_C1_050518	Yeast	0.673	0.287	0.193151
05/05/18	C_Y_C2_050518	Yeast	0.64	0.284	0.18176
05/05/18	C_Y_C3_050518	Yeast	0.669	0.276	0.184644
05/05/18	C_Y_C4_050518	Yeast	0.655	0.243	0.159165

05/05/18	C_Y_C5_050518	Yeast	0.697	0.301	0.209797
05/05/18	C_Y_C6_050518	Yeast	0.684	0.273	0.186732
05/05/18	C_Y_D1_050518	Yeast	0.664	0.276	0.183264
05/05/18	C_Y_D2_050518	Yeast	0.679	0.284	0.192836
05/05/18	C_Y_D3_050518	Yeast	0.636	0.266	0.169176
07/13/18	T_Y_C1_071318	Yeast	0.939	0.361	0.338979
07/13/18	T_Y_C2_071318	Yeast	0.774	0.316	0.244584
07/13/18	T_Y_C3_071318	Yeast	0.761	0.307	0.233627
07/13/18	T_Y_C4_071318	Yeast	0.871	0.393	0.342303
07/13/18	T_A_D1_071318	Algae	0.662	0.277	0.183374
07/13/18	T_A_D2_071318	Algae	0.631	0.272	0.171632
07/13/18	T_A_D3_071318	Algae	0.62	0.287	0.17794
07/13/18	T_A_D4_071318	Algae	0.541	0.237	0.128217
08/15/18	C_A_A1_081518	Algae	0.626	0.263	0.164638
08/15/18	C_A_A2_081518	Algae	0.63	0.258	0.16254
08/15/18	C_A_A3_081518	Algae	0.582	0.27	0.15714
08/15/18	C_A_A4_081518	Algae	0.646	0.25	0.1615
08/15/18	C_A_A5_081518	Algae	0.657	0.282	0.185274
08/15/18	C_A_A6_081518	Algae	0.474	0.198	0.093852
08/15/18	C_Y_B1_081518	Yeast	1.002	0.392	0.392784
08/15/18	C_Y_B2_081518	Yeast	0.773	0.332	0.256636
08/15/18	C_Y_B3_081518	Yeast	0.887	0.356	0.315772
08/15/18	C_Y_B4_081518	Yeast	0.942	0.342	0.322164
08/15/18	C_Y_B5_081518	Yeast	0.744	0.328	0.244032
08/15/18	C_Y_B6_081518	Yeast	0.756	0.316	0.238896
08/21/18	C_Y_A1_082118	Yeast	0.745	0.3	0.2235
08/21/18	C_Y_A2_082118	Yeast	0.631	0.304	0.191824
08/21/18	C_Y_A3_082118	Yeast	0.733	0.303	0.222099
08/21/18	C_Y_A4_082118	Yeast	0.753	0.323	0.243219
08/21/18	C_Y_A5_082118	Yeast	0.849	0.35	0.29715
08/21/18	C_Z_B1_082118	Zeaxanthin	0.805	0.348	0.28014
08/21/18	C_Z_B2_082118	Zeaxanthin	0.933	0.341	0.318153

08/21/18	C_Z_B3_082118	Zeaxanthin	0.713	0.299	0.213187
08/21/18	C_Z_B4_082118	Zeaxanthin	0.957	0.37	0.35409
08/21/18	C_Z_B5_082118	Zeaxanthin	0.841	0.339	0.285099
8/23/18	C_Y_A1_082318	Yeast	0.69	0.274	0.18906
8/23/18	C_Y_A2_082318	Yeast	0.729	0.327	0.238383
8/23/18	C_Y_A3_082318	Yeast	0.779	0.309	0.240711
8/23/18	C_Y_A4_082318	Yeast	0.804	0.312	0.250848
8/23/18	C_Y_A5_082318	Yeast	0.814	0.308	0.250712
8/23/18	C_Y_A6_082318	Yeast	0.659	0.287	0.189133
8/23/18	C_Y_B1_082318	Yeast	0.951	0.355	0.337605
8/23/18	C_Z_C1_082318	Zeaxanthin	0.72	0.299	0.21528
8/23/18	C_Z_C2_082318	Zeaxanthin	0.746	0.314	0.234244
8/23/18	C_Z_C3_082318	Zeaxanthin	0.669	0.307	0.205383
8/23/18	C_Z_C4_082318	Zeaxanthin	0.789	0.311	0.245379
8/23/18	C_Z_C5_082318	Zeaxanthin	0.677	0.308	0.208516
8/23/18	C_Z_C6_082318	Zeaxanthin	0.705	0.312	0.21996
8/23/18	C_Z_D1_082318	Zeaxanthin	0.858	0.354	0.303732
8/23/18	C_Z_D2_082318	Zeaxanthin	0.967	0.366	0.353922
8/23/18	C_Z_D3_082318	Zeaxanthin	0.911	0.398	0.362578
8/29/18	C_Y_C1_082918	Yeast	0.672	0.281	0.188832
8/29/18	C_Y_C2_082918	Yeast	0.759	0.306	0.232254
8/29/18	C_Y_C3_082918	Yeast	0.774	0.334	0.258516
8/29/18	C_Y_C4_082918	Yeast	0.72	0.318	0.22896
8/29/18	C_Y_C5_082918	Yeast	0.714	0.311	0.222054
8/29/18	C_Y_C6_082918	Yeast	0.982	0.386	0.379052
8/29/18	C_A_A1_082918	Algae	0.698	0.303	0.211494
8/29/18	C_A_A2_082918	Algae	0.852	0.337	0.287124
8/29/18	C_A_A3_082918	Algae	0.909	0.339	0.308151
8/29/18	C_A_A4_082918	Algae	0.896	0.373	0.334208
8/29/18	C_A_A5_082918	Algae	0.69	0.282	0.19458
8/29/18	C_A_A6_082918	Algae	0.767	0.307	0.235469
8/29/18	C_A_B1_082918	Algae	0.874	0.365	0.31901

9/6/18	C_Y_A1_090618	Yeast	1.015	0.386	0.39179
9/6/18	C_Y_A2_090618	Yeast	0.978	0.377	0.368706
9/6/18	C_Y_A3_090618	Yeast	0.76	0.324	0.24624
9/6/18	C_Y_A4_090618	Yeast	1.011	0.404	0.408444
9/6/18	C_Y_A6_090618	Yeast	0.987	0.399	0.393813
9/6/18	C_Y_B1_090618	Yeast	0.88	0.327	0.28776
9/6/18	C_Y_B2_090618	Yeast	1.024	0.372	0.380928
9/6/18	C_Y_B3_090618	Yeast	1.027	0.354	0.363558
9/6/18	C_Y_B4_090618	Yeast	0.935	0.35	0.32725
9/6/18	C_Y_B5_090618	Yeast	0.965	0.379	0.365735
9/6/18	C_A_C2_090618	Algae	0.798	0.324	0.258552
9/6/18	C_A_C3_090618	Algae	0.71	0.286	0.20306
9/6/18	C_A_C4_090618	Algae	0.972	0.366	0.355752
9/6/18	C_A_C5_090618	Algae	0.69	0.257	0.17733
9/6/18	C_A_C6_090618	Algae	0.769	0.311	0.239159
9/6/18	C_A_D1_090618	Algae	0.704	0.274	0.192896
9/6/18	C_A_D2_090618	Algae	0.758	0.286	0.216788
9/6/18	C_A_D4_090618	Algae	0.723	0.266	0.192318
9/6/18	C_A_D5_090618	Algae	0.716	0.288	0.206208
9/6/18	C_A_D6_090618	Algae	0.7	0.254	0.1778
09/07/18	C_A_A1_090718	Algae	0.628	0.253	0.158884
09/07/18	C_A_A2_090718	Algae	0.627	0.261	0.163647
09/07/18	C_A_A3_090718	Algae	0.636	0.299	0.190164
09/07/18	C_A_A4_090718	Algae	0.658	0.31	0.20398
09/07/18	C_A_A5_090718	Algae	0.773	0.334	0.258182
09/07/18	C_A_A6_090718	Algae	0.668	0.271	0.181028
09/07/18	C_A_B1_090718	Algae	0.883	0.339	0.299337
09/07/18	C_A_B2_090718	Algae	0.717	0.31	0.22227
09/07/18	C_A_B3_090718	Algae	0.71	0.296	0.21016
09/07/18	C_A_B4_090718	Algae	0.585	0.262	0.15327
09/07/18	C_A_B5_090718	Algae	0.747	0.311	0.232317
09/07/18	C_Y_C1_090718	Yeast	0.739	0.303	0.223917

09/07/18	C_Y_C2_090718	Yeast	0.895	0.348	0.31146
09/07/18	C_Y_C3_090718	Yeast	0.921	0.363	0.334323
09/07/18	C_Y_C4_090718	Yeast	0.728	0.306	0.222768
09/07/18	C_Y_C5_090718	Yeast	0.868	0.319	0.276892
09/07/18	C_Y_C6_090718	Yeast	0.924	0.35	0.3234
09/07/18	C_Y_D1_090718	Yeast	0.678	0.263	0.178314
09/07/18	C_Y_D2_090718	Yeast	0.877	0.372	0.326244
09/07/18	C_Y_D3_090718	Yeast	0.977	0.381	0.372237