

Exploration of 2016-2017 CITES Poaching Database

https://github.com/emilyrwood/CITES_Poaching_Wood

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```
# wrangling Goal: cleaning the raw dataset into a format compatible
```

```
CITESPoaching2016$Reported_quantity <- CITESPoaching2016$Importer_reported_quantity +  
  CITESPoaching2016$Exporter_reported_quantity
```

```
# Limit dataset to poaching occurrence measured by count not by weight. I'm  
# choosing count because the majority of cases are recorded in count not  
# weight. Select relevant columns
```

```
CITESPoaching2016["Unit"][is.na(CITESPoaching2016["Unit"])] <- "Count"
```

```
CITES2016_Processed <- CITESPoaching2016 %>%  
  filter(Unit == "Count") %>%  
  select(Year, Appendix, Class, Genus, Importer, Exporter, Importer_reported_quantity,  
    Exporter_reported_quantity, Term, Purpose, Reported_quantity) %>%  
  group_by(Appendix)
```

```
# Save the processed dataframe to processed folder  
getwd()
```

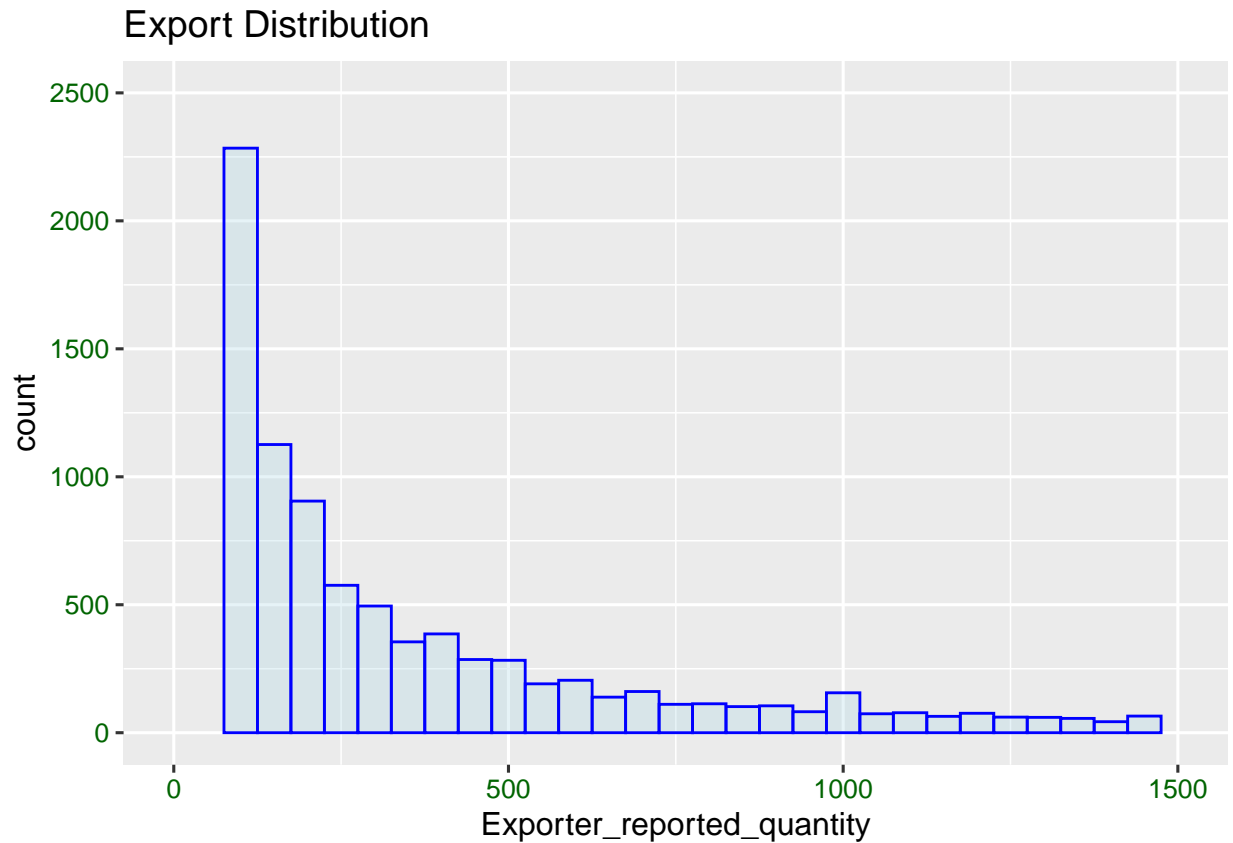
```
## [1] "/home/guest/EDA_2022/CITES_Poaching_Wood"
```

```
write.csv(CITES2016_Processed, row.names = FALSE, file = "./Data_Processed/CITES2016_Pro
```

```
Export.distribution <- ggplot(CITESPoaching2016, aes(x = Exporter_reported_quantity)) +  
  geom_histogram(binwidth = 50, colour = "blue", fill = "light blue", alpha = 0.3) +  
  xlim(0, 1500) + ylim(0, 2500) + labs(title = "Export Distribution")  
print(Export.distribution)
```

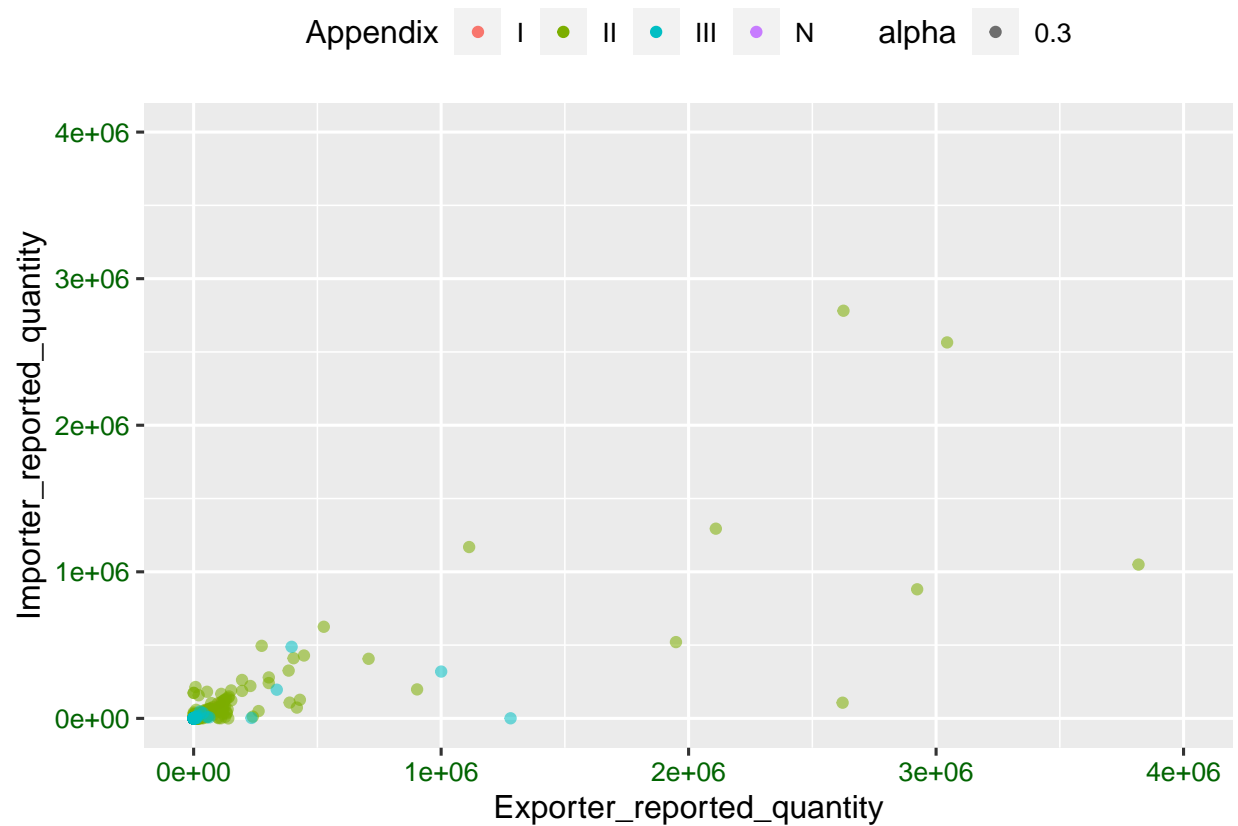
```
## Warning: Removed 25814 rows containing non-finite values (stat_bin).
```

```
## Warning: Removed 3 rows containing missing values (geom_bar).
```



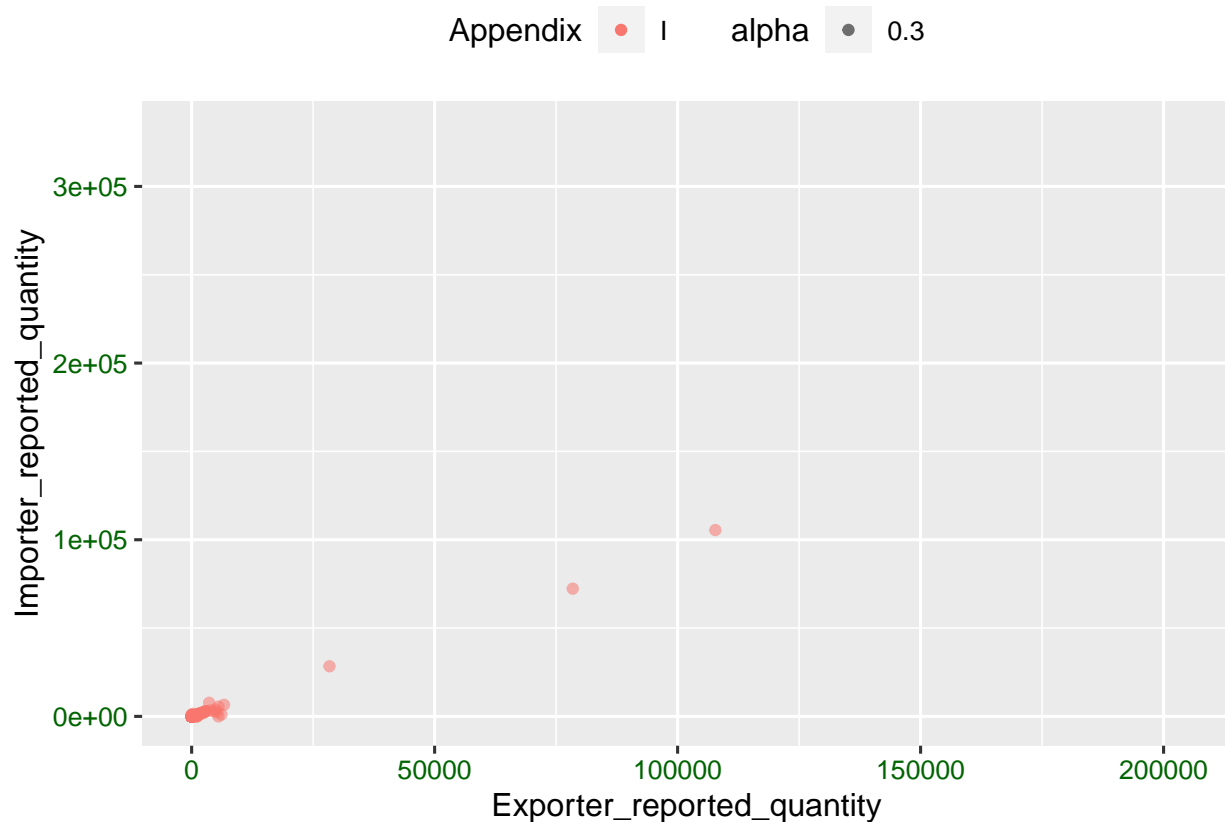
```
Import.distribution <- ggplot(CITESPoaching2016, aes(x = Importer_reported_quantity)) +  
  geom_histogram(binwidth = 50, colour = "dark green", fill = "light green", alpha = 0.5)  
  xlim(0, 1500) + ylim(0, 2500) + labs(title = "Import Distribution")  
print(Import.distribution)
```

```
## Warning: Removed 37201 rows containing non-finite values (stat_bin).  
## Removed 3 rows containing missing values (geom_bar).
```

```
Appendix1 <- ggplot(subset(CITESPoaching2016, Appendix == "I"), aes(x = Exporter_reported_quantity, y = Importer_reported_quantity, color = Appendix, alpha = 0.3)) + geom_point()
print(Appendix1)
```

```
## Warning: Removed 5059 rows containing missing values (geom_point).
```

```
# Remove Null Values and combine Export and Import amounts into a total
# reported quantity column. Previous graphs should not contain the zeros.
```

```
CITESPoaching2016["Importer_reported_quantity"][is.na(CITESPoaching2016["Importer_reported_quantity"])] = 0
```

```
CITESPoaching2016["Exporter_reported_quantity"][is.na(CITESPoaching2016["Exporter_reported_quantity"])] = 0
```

```
# Visualizing countries with greater number of exports and imports Found
# journal to visualize countries
# https://journal.r-project.org/archive/2011-1/RJournal_2011-1_South.pdf
# install.packages('rworldmap')
library(rworldmap)
```

```
# Importer Countries
```

```
CITES_Importer_withmap <- joinCountryData2Map(CITES2016_Processed, joinCode = "ISO_A2",
  nameJoinColumn = "Importer")
```

```
## 59647 codes from your data successfully matched countries in the map
## 1112 codes from your data failed to match with a country code in the map
## 41 codes from the map weren't represented in your data
```

```

mapDevice() #create world map shaped window
mapCountryData(CITES_Importer_withmap, nameColumnToPlot = "Importer")

## using catMethod='categorical' for non numeric data in mapCountryData
Importerplot1 <- ggplot(CITES2016_Processed, aes(x = Importer)) + geom_bar(binwidth = 50
  colour = "blue", fill = "light blue", alpha = 0.3)

## Warning: Ignoring unknown parameters: binwidth
print(Importerplot1)

# Difficult to interpret. Wrangle new dataset and create bar graph with only
# top 10 import countries:

table(CITES2016_Processed$Importer)

##
##  AD  AE  AF  AG  AI  AL  AM  AN  AO  AR  AT  AU  AW  AZ  BA  BB
##  29 1295 94 14 1 95 103 12 60 286 498 490 99 168 145 116
##  BD  BE  BF  BG  BH  BJ  BL  BM  BN  BO  BQ  BR  BS  BW  BY  BZ
##  153 390 1 94 378 2 58 12 83 4 42 381 48 4 297 3
##  CA  CC  CD  CF  CG  CH  CI  CL  CM  CN  CO  CR  CU  CV  CW  CY
##  1230 4 21 1 17 2226 42 299 8 1779 74 108 7 7 107 87
##  CZ  DE  DJ  DK  DM  DO  DZ  EC  EE  EG  ER  ES  ET  FI  FJ  FO
##  409 4652 1 446 1 92 69 16 20 134 3 693 11 53 5 24
##  FR  GA  GB  GD  GE  GF  GG  GH  GI  GL  GM  GN  GP  GQ  GR  GT
##  2350 4 1121 4 145 60 17 51 45 9 1 2 127 2 138 197
##  GU  GY  HK  HN  HR  HT  HU  ID  IE  IL  IM  IN  IQ  IR  IS  IT
##  23 2 2249 8 9 5 124 337 88 362 6 317 202 252 29 1136
##  JE  JM  JO  JP  KE  KG  KH  KN  KP  KR  KW  KY  KZ  LA  LB  LC
##  29 9 220 4797 36 68 35 13 111 1206 671 21 376 30 385 5
##  LI  LK  LR  LT  LU  LV  LY  MA  MC  MD  ME  MF  MG  MK  ML  MM
##  10 22 2 48 12 29 25 176 172 159 92 18 93 142 3 28
##  MN  MO  MP  MQ  MR  MT  MU  MV  MW  MX  MY  MZ  NC  NE  NG  NI
##  18 265 8 114 2 4 86 97 8 608 622 12 9 4 87 11
##  NL  NO  NP  NZ  OM  PA  PE  PF  PG  PH  PK  PL  PR  PT  PW  PY
##  675 884 68 489 332 117 117 5 3 378 260 251 9 148 6 22
##  QA  RE  RO  RS  RU  RW  SA  SC  SD  SE  SG  SI  SK  SM  SN  SR
##  781 147 84 141 861 3 407 1 14 213 1364 24 68 122 87 99
##  SU  SV  SX  SY  SZ  TC  TD  TF  TG  TH  TJ  TK  TL  TM  TN  TR
##  7 22 64 4 7 1 2 2 5 812 26 2 2 63 98 938
##  TT  TW  TZ  UA  UG  US  UY  UZ  VC  VE  VG  VI  VN  WS  XV  XX
##  61 1066 13 483 19 8678 23 163 2 28 14 2 231 1 39 499
##  YE  YT  YU  ZA  ZM  ZW
##  2 1 5 523 8 74

```

```
ImporterData <- CITES2016_Processed %>%
  group_by(Importer) %>%
  summarise(Importer, count = n()) %>%
  filter(Importer == "US" | Importer == "JP" | Importer == "DE" | Importer == "FR" |
    Importer == "HK" | Importer == "CH" | Importer == "CN" | Importer == "SG" |
    Importer == "AE" | Importer == "CA")
```

`summarise()` has grouped output by 'Importer'. You can override using the
`.groups` argument.

```
Importerplot2 <- ggplot(ImporterData, aes(x = Importer)) + geom_bar(binwidth = 50,
  colour = "purple", fill = "lavender", alpha = 0.3)
```

Warning: Ignoring unknown parameters: binwidth

```
print(Importerplot2)
```

Exporter Countries

```
CITES_Exporter_withmap <- joinCountryData2Map(CITES2016_Processed, joinCode = "ISO_A2",
  nameJoinColumn = "Exporter")
```

60130 codes from your data successfully matched countries in the map
629 codes from your data failed to match with a country code in the map
44 codes from the map weren't represented in your data

```
mapDevice() #create world map shaped window
mapCountryData(CITES_Exporter_withmap, nameColumnToPlot = "Exporter")
```

using catMethod='categorical' for non numeric data in mapCountryData

```
Exporterplot1 <- ggplot(CITES2016_Processed, aes(x = Exporter)) + geom_bar(binwidth = 50,
  colour = "blue", fill = "light blue", alpha = 0.3)
```

Warning: Ignoring unknown parameters: binwidth

```
print(Exporterplot1)
```

*# Difficult to interpret. Wrangle new dataset and create bar graph with only
top 10 export countries:*

```
table(CITES2016_Processed$Exporter)
```

```
##
##  AD  AE  AG  AL  AM  AO  AQ  AR  AT  AU  AW  AZ  BB  BD  BE  BG
##   2 838   8   5  27  10   2 302 305 1391   2  10  35   2 1153  15
##  BH  BI  BJ  BL  BM  BO  BR  BS  BW  BY  BZ  CA  CD  CF  CG  CH
##  52   1  24   4  35  16 463  42   3  30  15 1040  46   9  17 1339
##  CI  CK  CL  CM  CN  CO  CR  CU  CV  CW  CY  CZ  DD  DE  DK  DM
```

```
## 22 15 46 35 1133 497 52 86 1 27 1 751 1 1859 313 7
## DO EC EE EG ER ES ET FI FJ FK FM FO FR GA GB GD
## 109 1500 35 8 2 1056 73 35 501 9 52 1 2720 11 1038 5
## GE GG GH GI GL GM GN GP GQ GR GS GT GW GY HK HN
## 19 18 57 2 109 1 4 1 11 84 2 21 7 314 730 6
## HR HT HU ID IE IL IM IN IO IQ IR IS IT JE JM JO
## 16 10 49 6449 33 36 1 345 10 4 3 15 4776 82 69 14
## JP KE KG KH KI KM KN KR KW KY KZ LA LB LC LI LK
## 838 114 26 35 2 2 12 273 283 17 77 142 40 4 2 87
## LR LS LT LU LV MA MC MG MH MK ML MM MN MO MT MU
## 11 1 24 64 39 38 421 867 56 28 60 16 51 52 37 39
## MV MW MX MY MZ NC NE NG NI NL NO NP NZ OM PA PE
## 6 15 378 1258 80 2 1 15 60 7156 97 7 97 115 113 1226
## PF PG PH PK PL PT PW PY QA RO RS RU RW SA SB SC
## 8 22 1150 37 35 179 64 12 172 27 66 194 5 35 95 29
## SD SE SG SH SI SK SL SM SN SR ST SV SX SY SZ TC
## 37 101 1315 5 45 35 1 19 28 117 6 65 8 10 1 9
## TD TG TH TJ TK TL TN TO TR TT TW TZ UA UG US UY
## 3 65 1371 15 1 1 36 275 218 14 618 164 93 56 3879 49
## UZ VC VE VG VN VU XV XX YE ZA ZM ZW ZZ
## 110 1 74 15 189 4 3 61 5 1369 128 524 6
```

```
ExporterData <- CITES2016_Processed %>%
  group_by(Exporter) %>%
  summarise(Exporter, count = n()) %>%
  filter(Exporter == "NL" | Exporter == "ID" | Exporter == "IT" | Exporter == "US" |
         Exporter == "FR" | Exporter == "DE" | Exporter == "EC" | Exporter == "AU" |
         Exporter == "TH" | Exporter == "ZA")
```

```
## `summarise()` has grouped output by 'Exporter'. You can override using the
## `.groups` argument.
```

```
Exporterplot2 <- ggplot(ExporterData, aes(x = Exporter)) + geom_bar(binwidth = 50,
  colour = "blue", fill = "light blue", alpha = 0.3)
```

```
## Warning: Ignoring unknown parameters: binwidth
```

```
print(Exporterplot2)
```

```
# Which Classes get poached most often?
```

```
Classplot1 <- ggplot(CITES2016_Processed, aes(x = Class)) + geom_bar(aes(fill = Class))
  labs(title = "Classes of poaching occurrences 2016", x = "Class", y = "Count") +
  theme(legend.position = "none") + coord_flip()
```

```
print(Classplot1)
```

```

# This has a lot of NAs perhaps they didn't record always the Class Faceted by
# appendix

Classplot2 <- ggplot(CITES2016_Processed, aes(x = Class)) + geom_bar(aes(fill = Class))
  labs(title = "Classes of poaching occurrences 2016", x = "Class", y = "Count") +
  coord_flip() + facet_grid(rows = "Appendix") + theme(axis.text = element_text(size =
print(Classplot2)

# create a facet dataset for Appendix I

AppendixI_Facet <- CITES2016_Processed %>%
  filter(Appendix == "I")

# A closer look at Mammalia

Mammalia_terms <- ggplot(subset(AppendixI_Facet, Class %in% "Mammalia"), aes(x = Term))
  geom_bar(aes(fill = Term)) + coord_flip() + theme(axis.text = element_text(size = 5)
  legend.key.size = unit(0.2, "cm"), legend.key.height = unit(0.2, "cm"), legend.key.w
    "cm"), legend.title = element_text(size = 3), legend.text = element_text(size =
print(Mammalia_terms)

# A closer look at Aves

Aves_terms <- ggplot(subset(AppendixI_Facet, Class %in% "Aves"), aes(x = Term)) +
  geom_bar(aes(fill = Term)) + coord_flip() + theme(axis.text = element_text(size = 5)
  legend.key.size = unit(0.2, "cm"), legend.key.height = unit(0.2, "cm"), legend.key.w
    "cm"), legend.title = element_text(size = 3), legend.text = element_text(size =
print(Aves_terms)

# A closer look at Reptilia

Reptilia_terms <- ggplot(subset(AppendixI_Facet, Class %in% "Reptilia"), aes(x = Term))
  geom_bar(aes(fill = Term)) + coord_flip() + theme(axis.text = element_text(size = 5)
  legend.key.size = unit(0.2, "cm"), legend.key.height = unit(0.2, "cm"), legend.key.w
    "cm"), legend.title = element_text(size = 3), legend.text = element_text(size =
print(Reptilia_terms)

# Why arent plants represented in Class? monocotyledons or dicotyledons not
# depicted so potentiall in NAs

```

```

AppendixI_Facet["Class"][is.na(AppendixI_Facet["Class"])] <- "Not_recorded"

NA_terms <- ggplot(subset(AppendixI_Facet, Class %in% "Not_recorded"), aes(x = Term)) +
  geom_bar(aes(fill = Term)) + coord_flip() + theme(axis.text = element_text(size = 5),
  legend.key.size = unit(0.2, "cm"), legend.key.height = unit(0.2, "cm"), legend.key.w
    "cm"), legend.title = element_text(size = 3), legend.text = element_text(size =
print(NA_terms)

```

1 Rationale and Research Questions

Does level of protection, class, term affect the amount exported/imported?

What might the best set of predictors for Poaching?

Two way ANOVA

Linear modeling

*# 1.How Does Reported Poaching Quantity vary over Class and Term for only
Appendix 1.*

```

Poaching.2way <- aov(data = AppendixI_Facet, Reported_quantity ~ Class + Term)
summary(Poaching.2way)

```

```

##           Df      Sum Sq   Mean Sq F value    Pr(>F)
## Class      6 4.467e+09 744583316   9.911 1.37e-10 ***
## Term      26 3.259e+09 125332949   1.668  0.0198 *
## Residuals 853 6.408e+10  75125682
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 4768 observations deleted due to missingness

```

*# P-value is small. Reject our null hypothesis that the mean across our groups
is different. Not enough information to tell us which groups are differing*

```

Poaching.2way2lm <- lm(data = AppendixI_Facet, Reported_quantity ~ Class + Term)
summary(Poaching.2way2lm)

```

```

##
## Call:
## lm(formula = Reported_quantity ~ Class + Term, data = AppendixI_Facet)
##
## Residuals:

```

```

##      Min      1Q  Median      3Q      Max
## -11288      -54      -40      -11 201942
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      1.128e+04  6.391e+03   1.764   0.078 .
## ClassAmphibia    -1.169e+04  9.028e+03  -1.295   0.196
## ClassAves        -1.123e+04  1.542e+03  -7.282 7.46e-13 ***
## ClassCoelacanthi -1.124e+04  9.390e+03  -1.197   0.232
## ClassMammalia     -1.127e+04  1.812e+03  -6.220 7.76e-10 ***
## ClassNot_recorded -1.123e+04  1.521e+03  -7.386 3.59e-13 ***
## ClassReptilia     -1.087e+04  2.602e+03  -4.175 3.28e-05 ***
## Termbodies        -3.633e+01  7.032e+03  -0.005   0.996
## Termbones         2.100e+01  1.062e+04   0.002   0.998
## Termcarvings      -2.632e+02  6.612e+03  -0.040   0.968
## Termcloth         2.000e+00  1.062e+04   0.000   1.000
## Termcosmetics      5.633e+04  1.083e+04   5.204 2.45e-07 ***
## Termeggs          7.105e+01  7.359e+03   0.010   0.992
## Termfeathers      -3.855e+01  1.069e+04  -0.004   0.997
## Termfeet         -2.000e+00  8.668e+03   0.000   1.000
## Termgarments      -2.610e+02  7.397e+03  -0.035   0.972
## Termhair          2.260e+02  1.062e+04   0.021   0.983
## Termhorn carvings -2.000e+00  1.062e+04   0.000   1.000
## Termivory carvings 2.679e+01  6.248e+03   0.004   0.997
## Termivory pieces   1.570e-11  1.062e+04   0.000   1.000
## Termleather products (large) -4.078e+02  1.083e+04  -0.038   0.970
## Termleather products (small) -3.057e+02  6.644e+03  -0.046   0.963
## Termlive          1.360e+01  6.230e+03   0.002   0.998
## Termoil           1.063e+04  1.083e+04   0.982   0.326
## Termpiano keys    2.540e+02  7.912e+03   0.032   0.974
## Termskin pieces    1.765e+03  1.083e+04   0.163   0.871
## Termskins         3.111e+02  6.609e+03   0.047   0.962
## Termskulls        5.000e+00  8.668e+03   0.001   1.000
## Termspecimens     4.168e+02  6.420e+03   0.065   0.948
## Termteeth         1.880e+02  8.668e+03   0.022   0.983
## Termtrophies      8.776e+00  6.253e+03   0.001   0.999
## Termtusks         1.830e+01  6.292e+03   0.003   0.998
## Termwood product  -1.015e+01  6.776e+03  -0.001   0.999
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 8668 on 853 degrees of freedom
## (4768 observations deleted due to missingness)
## Multiple R-squared:  0.1076, Adjusted R-squared:  0.07412
## F-statistic: 3.214 on 32 and 853 DF,  p-value: 9.76e-09

```

means are different. Reject null

TukeyHSD(Poaching.2way)

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = Reported_quantity ~ Class + Term, data = AppendixI_Facet)
##
## $Class
##              diff          lwr          upr          p adj
## Amphibia-Actinopteri -1.128759e+04 -37247.303 14672.114 0.8588566
## Aves-Actinopteri     -1.123236e+04 -15772.442 -6692.282 0.0000000
## Coelacanthi-Actinopteri -1.128759e+04 -37247.303 14672.114 0.8588566
## Mammalia-Actinopteri  -1.124305e+04 -15784.531 -6701.579 0.0000000
## Not_recorded-Actinopteri -1.123459e+04 -15717.307 -6751.882 0.0000000
## Reptilia-Actinopteri  -1.025311e+04 -15099.786 -5406.433 0.0000000
## Aves-Amphibia        5.523246e+01 -25616.737 25727.202 1.0000000
## Coelacanthi-Amphibia -6.821210e-13 -36226.291 36226.291 1.0000000
## Mammalia-Amphibia    4.453965e+01 -25627.677 25716.756 1.0000000
## Not_recorded-Amphibia 5.300054e+01 -25608.886 25714.887 1.0000000
## Reptilia-Amphibia    1.034485e+03 -24693.476 26762.446 0.9999998
## Coelacanthi-Aves     -5.523246e+01 -25727.202 25616.737 1.0000000
## Mammalia-Aves        -1.069281e+01 -2412.478 2391.093 1.0000000
## Not_recorded-Aves    -2.231917e+00 -2290.961 2286.497 1.0000000
## Reptilia-Aves        9.792528e+02 -1959.087 3917.593 0.9572473
## Mammalia-Coelacanthi 4.453965e+01 -25627.677 25716.756 1.0000000
## Not_recorded-Coelacanthi 5.300054e+01 -25608.886 25714.887 1.0000000
## Reptilia-Coelacanthi 1.034485e+03 -24693.476 26762.446 0.9999998
## Not_recorded-Mammalia 8.460892e+00 -2283.036 2299.958 1.0000000
## Reptilia-Mammalia    9.899456e+02 -1950.551 3930.442 0.9551104
## Reptilia-Not_recorded 9.814847e+02 -1867.414 3830.384 0.9498794
##
## $Term
##              diff          lwr
## bodies-baleen -4.077150e+00 -25419.651
## bones-baleen   2.100000e+01 -39352.637
## carvings-baleen -6.595024e+02 -24558.394
## cloth-baleen    2.000000e+00 -39371.637
## cosmetics-baleen 5.574605e+04 16372.417
## eggs-baleen     1.009072e+02 -26796.408
## feathers-baleen -8.692809e+00 -39382.330
## feet-baleen    -2.000000e+00 -32150.440
## garments-baleen -5.995785e+02 -27496.893
```


## hair-baleen	2.260000e+02	-39147.637
## horn carvings-baleen	-2.000000e+00	-39375.637
## ivory carvings-baleen	2.679412e+01	-23147.033
## ivory pieces-baleen	1.580247e-11	-39373.637
## leather products (large)-baleen	-9.919456e+02	-40365.583
## leather products (small)-baleen	-8.898534e+02	-24245.154
## live-baleen	3.723147e+01	-22734.787
## oil-baleen	1.004605e+04	-29327.583
## piano keys-baleen	2.540000e+02	-29093.376
## skin pieces-baleen	1.181054e+03	-38192.583
## skins-baleen	-2.587762e+02	-23539.003
## skulls-baleen	5.000000e+00	-32143.440
## specimens-baleen	1.327203e+02	-23345.181
## teeth-baleen	1.880000e+02	-31960.440
## trophies-baleen	8.775510e+00	-23182.891
## tusks-baleen	1.829730e+01	-23320.386
## wood product-baleen	2.172093e+01	-24690.982
## bones-bodies	2.507715e+01	-34073.493
## carvings-bodies	-6.554252e+02	-14204.823
## cloth-bodies	6.077150e+00	-34092.493
## cosmetics-bodies	5.575013e+04	21651.561
## eggs-bodies	1.049843e+02	-18222.446
## feathers-bodies	-4.615658e+00	-34103.186
## feet-bodies	2.077150e+00	-25413.496
## garments-bodies	-5.955013e+02	-18922.932
## hair-bodies	2.300772e+02	-33868.493
## horn carvings-bodies	2.077150e+00	-34096.493
## ivory carvings-bodies	3.087127e+01	-12194.325
## ivory pieces-bodies	4.077150e+00	-34094.493
## leather products (large)-bodies	-9.878685e+02	-35086.439
## leather products (small)-bodies	-8.857762e+02	-13451.572
## live-bodies	4.130862e+01	-11403.951
## oil-bodies	1.005013e+04	-24048.439
## piano keys-bodies	2.580772e+02	-21506.520
## skin pieces-bodies	1.185132e+03	-32913.439
## skins-bodies	-2.546991e+02	-12680.404
## skulls-bodies	9.077150e+00	-25406.496
## specimens-bodies	1.367974e+02	-12655.427
## teeth-bodies	1.920772e+02	-25223.496
## trophies-bodies	1.285266e+01	-12246.126
## tusks-bodies	2.237445e+01	-12512.509
## wood product-bodies	2.579808e+01	-14912.302
## carvings-bones	-6.805024e+02	-33664.106
## cloth-bones	-1.900000e+01	-45483.760
## cosmetics-bones	5.572505e+04	10260.294

## eggs-bones	7.990719e+01	-35136.945
## feathers-bones	-2.969281e+01	-45494.453
## feet-bones	-2.300000e+01	-39396.637
## garments-bones	-6.205785e+02	-35837.430
## hair-bones	2.050000e+02	-45259.760
## horn carvings-bones	-2.300000e+01	-45487.760
## ivory carvings-bones	5.794118e+00	-32456.297
## ivory pieces-bones	-2.100000e+01	-45485.760
## leather products (large)-bones	-1.012946e+03	-46477.706
## leather products (small)-bones	-9.108534e+02	-33502.741
## live-bones	1.623147e+01	-32160.249
## oil-bones	1.002505e+04	-35439.706
## piano keys-bones	2.330000e+02	-36888.821
## skin pieces-bones	1.160054e+03	-44304.706
## skins-bones	-2.797762e+02	-32817.909
## skulls-bones	-1.600000e+01	-39389.637
## specimens-bones	1.117203e+02	-32568.135
## teeth-bones	1.670000e+02	-39206.637
## trophies-bones	-1.222449e+01	-32487.053
## tusks-bones	-2.702703e+00	-32582.685
## wood product-bones	7.209262e-01	-33577.230
## cloth-carvings	6.615024e+02	-32322.101
## cosmetics-carvings	5.640556e+04	23421.953
## eggs-carvings	7.604095e+02	-15398.190
## feathers-carvings	6.508095e+02	-32332.794
## feet-carvings	6.575024e+02	-23241.389
## garments-carvings	5.992386e+01	-16098.676
## hair-carvings	8.855024e+02	-32098.101
## horn carvings-carvings	6.575024e+02	-32326.101
## ivory carvings-carvings	6.862965e+02	-7954.366
## ivory pieces-carvings	6.595024e+02	-32324.101
## leather products (large)-carvings	-3.324433e+02	-33316.047
## leather products (small)-carvings	-2.303510e+02	-9346.537
## live-carvings	6.967338e+02	-6799.906
## oil-carvings	1.070556e+04	-22278.047
## piano keys-carvings	9.135024e+02	-19059.061
## skin pieces-carvings	1.840557e+03	-31143.047
## skins-carvings	4.007261e+02	-8521.368
## skulls-carvings	6.645024e+02	-23234.389
## specimens-carvings	7.922226e+02	-8633.627
## teeth-carvings	8.475024e+02	-23051.389
## trophies-carvings	6.682779e+02	-8020.116
## tusks-carvings	6.777997e+02	-8395.730
## wood product-carvings	6.812233e+02	-11498.780
## cosmetics-cloth	5.574405e+04	10279.294

## eggs-cloth	9.890719e+01	-35117.945
## feathers-cloth	-1.069281e+01	-45475.453
## feet-cloth	-4.000000e+00	-39377.637
## garments-cloth	-6.015785e+02	-35818.430
## hair-cloth	2.240000e+02	-45240.760
## horn carvings-cloth	-4.000000e+00	-45468.760
## ivory carvings-cloth	2.479412e+01	-32437.297
## ivory pieces-cloth	-2.000000e+00	-45466.760
## leather products (large)-cloth	-9.939456e+02	-46458.706
## leather products (small)-cloth	-8.918534e+02	-33483.741
## live-cloth	3.523147e+01	-32141.249
## oil-cloth	1.004405e+04	-35420.706
## piano keys-cloth	2.520000e+02	-36869.821
## skin pieces-cloth	1.179054e+03	-44285.706
## skins-cloth	-2.607762e+02	-32798.909
## skulls-cloth	3.000000e+00	-39370.637
## specimens-cloth	1.307203e+02	-32549.135
## teeth-cloth	1.860000e+02	-39187.637
## trophies-cloth	6.775510e+00	-32468.053
## tusks-cloth	1.629730e+01	-32563.685
## wood product-cloth	1.972093e+01	-33558.230
## eggs-cosmetics	-5.564515e+04	-90861.999
## feathers-cosmetics	-5.575475e+04	-101219.507
## feet-cosmetics	-5.574805e+04	-95121.692
## garments-cosmetics	-5.634563e+04	-91562.485
## hair-cosmetics	-5.552005e+04	-100984.814
## horn carvings-cosmetics	-5.574805e+04	-101212.814
## ivory carvings-cosmetics	-5.571926e+04	-88181.351
## ivory pieces-cosmetics	-5.574605e+04	-101210.814
## leather products (large)-cosmetics	-5.673800e+04	-102202.760
## leather products (small)-cosmetics	-5.663591e+04	-89227.796
## live-cosmetics	-5.570882e+04	-87885.304
## oil-cosmetics	-4.570000e+04	-91164.760
## piano keys-cosmetics	-5.549205e+04	-92613.876
## skin pieces-cosmetics	-5.456500e+04	-100029.760
## skins-cosmetics	-5.600483e+04	-88542.963
## skulls-cosmetics	-5.574105e+04	-95114.692
## specimens-cosmetics	-5.561333e+04	-88293.189
## teeth-cosmetics	-5.555805e+04	-94931.692
## trophies-cosmetics	-5.573728e+04	-88212.107
## tusks-cosmetics	-5.572776e+04	-88307.739
## wood product-cosmetics	-5.572433e+04	-89302.284
## feathers-eggs	-1.096000e+02	-35326.452
## feet-eggs	-1.029072e+02	-27000.222
## garments-eggs	-7.004857e+02	-21032.944

## hair-eggs	1.250928e+02	-35091.759
## horn carvings-eggs	-1.029072e+02	-35319.759
## ivory carvings-eggs	-7.411307e+01	-15139.623
## ivory pieces-eggs	-1.009072e+02	-35317.759
## leather products (large)-eggs	-1.092853e+03	-36309.705
## leather products (small)-eggs	-9.907606e+02	-16333.948
## live-eggs	-6.367573e+01	-14503.487
## oil-eggs	9.945147e+03	-25271.705
## piano keys-eggs	1.530928e+02	-23324.808
## skin pieces-eggs	1.080147e+03	-34136.705
## skins-eggs	-3.596834e+02	-15588.350
## skulls-eggs	-9.590719e+01	-26993.222
## specimens-eggs	3.181308e+01	-15497.359
## teeth-eggs	8.709281e+01	-26810.222
## trophies-eggs	-9.213168e+01	-15185.068
## tusks-eggs	-8.260989e+01	-15400.491
## wood product-eggs	-7.918627e+01	-17418.765
## feet-feathers	6.692809e+00	-39366.944
## garments-feathers	-5.908857e+02	-35807.737
## hair-feathers	2.346928e+02	-45230.067
## horn carvings-feathers	6.692809e+00	-45458.067
## ivory carvings-feathers	3.548693e+01	-32426.604
## ivory pieces-feathers	8.692809e+00	-45456.067
## leather products (large)-feathers	-9.832528e+02	-46448.013
## leather products (small)-feathers	-8.811606e+02	-33473.048
## live-feathers	4.592427e+01	-32130.556
## oil-feathers	1.005475e+04	-35410.013
## piano keys-feathers	2.626928e+02	-36859.128
## skin pieces-feathers	1.189747e+03	-44275.013
## skins-feathers	-2.500834e+02	-32788.216
## skulls-feathers	1.369281e+01	-39359.944
## specimens-feathers	1.414131e+02	-32538.442
## teeth-feathers	1.966928e+02	-39176.944
## trophies-feathers	1.746832e+01	-32457.360
## tusks-feathers	2.699011e+01	-32552.992
## wood product-feathers	3.041373e+01	-33547.537
## garments-feet	-5.975785e+02	-27494.893
## hair-feet	2.280000e+02	-39145.637
## horn carvings-feet	0.000000e+00	-39373.637
## ivory carvings-feet	2.879412e+01	-23145.033
## ivory pieces-feet	2.000000e+00	-39371.637
## leather products (large)-feet	-9.899456e+02	-40363.583
## leather products (small)-feet	-8.878534e+02	-24243.154
## live-feet	3.923147e+01	-22732.787
## oil-feet	1.004805e+04	-29325.583

## piano keys-feet	2.560000e+02	-29091.376
## skin pieces-feet	1.183054e+03	-38190.583
## skins-feet	-2.567762e+02	-23537.003
## skulls-feet	7.000000e+00	-32141.440
## specimens-feet	1.347203e+02	-23343.181
## teeth-feet	1.900000e+02	-31958.440
## trophies-feet	1.077551e+01	-23180.891
## tusks-feet	2.029730e+01	-23318.386
## wood product-feet	2.372093e+01	-24688.982
## hair-garments	8.255785e+02	-34391.273
## horn carvings-garments	5.975785e+02	-34619.273
## ivory carvings-garments	6.263726e+02	-14439.137
## ivory pieces-garments	5.995785e+02	-34617.273
## leather products (large)-garments	-3.923671e+02	-35609.219
## leather products (small)-garments	-2.902749e+02	-15633.462
## live-garments	6.368100e+02	-13803.001
## oil-garments	1.064563e+04	-24571.219
## piano keys-garments	8.535785e+02	-22624.323
## skin pieces-garments	1.780633e+03	-33436.219
## skins-garments	3.408023e+02	-14887.865
## skulls-garments	6.045785e+02	-26292.736
## specimens-garments	7.322988e+02	-14796.873
## teeth-garments	7.875785e+02	-26109.736
## trophies-garments	6.083540e+02	-14484.582
## tusks-garments	6.178758e+02	-14700.005
## wood product-garments	6.212994e+02	-16718.280
## horn carvings-hair	-2.280000e+02	-45692.760
## ivory carvings-hair	-1.992059e+02	-32661.297
## ivory pieces-hair	-2.260000e+02	-45690.760
## leather products (large)-hair	-1.217946e+03	-46682.706
## leather products (small)-hair	-1.115853e+03	-33707.741
## live-hair	-1.887685e+02	-32365.249
## oil-hair	9.820054e+03	-35644.706
## piano keys-hair	2.800000e+01	-37093.821
## skin pieces-hair	9.550544e+02	-44509.706
## skins-hair	-4.847762e+02	-33022.909
## skulls-hair	-2.210000e+02	-39594.637
## specimens-hair	-9.327973e+01	-32773.135
## teeth-hair	-3.800000e+01	-39411.637
## trophies-hair	-2.172245e+02	-32692.053
## tusks-hair	-2.077027e+02	-32787.685
## wood product-hair	-2.042791e+02	-33782.230
## ivory carvings-horn carvings	2.879412e+01	-32433.297
## ivory pieces-horn carvings	2.000000e+00	-45462.760
## leather products (large)-horn carvings	-9.899456e+02	-46454.706

## leather products (small)-horn carvings	-8.878534e+02	-33479.741
## live-horn carvings	3.923147e+01	-32137.249
## oil-horn carvings	1.004805e+04	-35416.706
## piano keys-horn carvings	2.560000e+02	-36865.821
## skin pieces-horn carvings	1.183054e+03	-44281.706
## skins-horn carvings	-2.567762e+02	-32794.909
## skulls-horn carvings	7.000000e+00	-39366.637
## specimens-horn carvings	1.347203e+02	-32545.135
## teeth-horn carvings	1.900000e+02	-39183.637
## trophies-horn carvings	1.077551e+01	-32464.053
## tusks-horn carvings	2.029730e+01	-32559.685
## wood product-horn carvings	2.372093e+01	-33554.230
## ivory pieces-ivory carvings	-2.679412e+01	-32488.885
## leather products (large)-ivory carvings	-1.018740e+03	-33480.831
## leather products (small)-ivory carvings	-9.166475e+02	-7914.797
## live-ivory carvings	1.043735e+01	-4687.312
## oil-ivory carvings	1.001926e+04	-22442.831
## piano keys-ivory carvings	2.272059e+02	-18871.814
## skin pieces-ivory carvings	1.154260e+03	-31307.831
## skins-ivory carvings	-2.855703e+02	-7028.937
## skulls-ivory carvings	-2.179412e+01	-23195.621
## specimens-ivory carvings	1.059262e+02	-7291.092
## teeth-ivory carvings	1.612059e+02	-23012.621
## trophies-ivory carvings	-1.801861e+01	-6448.993
## tusks-ivory carvings	-8.496820e+00	-6950.987
## wood product-ivory carvings	-5.073191e+00	-10692.529
## leather products (large)-ivory pieces	-9.919456e+02	-46456.706
## leather products (small)-ivory pieces	-8.898534e+02	-33481.741
## live-ivory pieces	3.723147e+01	-32139.249
## oil-ivory pieces	1.004605e+04	-35418.706
## piano keys-ivory pieces	2.540000e+02	-36867.821
## skin pieces-ivory pieces	1.181054e+03	-44283.706
## skins-ivory pieces	-2.587762e+02	-32796.909
## skulls-ivory pieces	5.000000e+00	-39368.637
## specimens-ivory pieces	1.327203e+02	-32547.135
## teeth-ivory pieces	1.880000e+02	-39185.637
## trophies-ivory pieces	8.775510e+00	-32466.053
## tusks-ivory pieces	1.829730e+01	-32561.685
## wood product-ivory pieces	2.172093e+01	-33556.230
## leather products (small)-leather products (large)	1.020922e+02	-32489.796
## live-leather products (large)	1.029177e+03	-31147.304
## oil-leather products (large)	1.103800e+04	-34426.760
## piano keys-leather products (large)	1.245946e+03	-35875.876
## skin pieces-leather products (large)	2.173000e+03	-43291.760
## skins-leather products (large)	7.331694e+02	-31804.963

## skulls-leather products (large)	9.969456e+02	-38376.692
## specimens-leather products (large)	1.124666e+03	-31555.189
## teeth-leather products (large)	1.179946e+03	-38193.692
## trophies-leather products (large)	1.000721e+03	-31474.107
## tusks-leather products (large)	1.010243e+03	-31569.739
## wood product-leather products (large)	1.013667e+03	-32564.284
## live-leather products (small)	9.270849e+02	-4596.741
## oil-leather products (small)	1.093591e+04	-21655.980
## piano keys-leather products (small)	1.143853e+03	-18174.955
## skin pieces-leather products (small)	2.070908e+03	-30520.980
## skins-leather products (small)	6.310772e+02	-6711.729
## skulls-leather products (small)	8.948534e+02	-22460.447
## specimens-leather products (small)	1.022574e+03	-6924.733
## teeth-leather products (small)	1.077853e+03	-22277.447
## trophies-leather products (small)	8.986289e+02	-6158.370
## tusks-leather products (small)	9.081507e+02	-6617.936
## wood product-leather products (small)	9.115743e+02	-10163.872
## oil-live	1.000882e+04	-22167.658
## piano keys-live	2.167685e+02	-18392.667
## skin pieces-live	1.143823e+03	-31032.658
## skins-live	-2.960077e+02	-5493.273
## skulls-live	-3.223147e+01	-22804.250
## specimens-live	9.548881e+01	-5925.678
## teeth-live	1.507685e+02	-22621.250
## trophies-live	-2.845596e+01	-4813.432
## tusks-live	-1.893417e+01	-5472.074
## wood product-live	-1.551054e+01	-9801.228
## piano keys-oil	-9.792054e+03	-46913.876
## skin pieces-oil	-8.865000e+03	-54329.760
## skins-oil	-1.030483e+04	-42842.963
## skulls-oil	-1.004105e+04	-49414.692
## specimens-oil	-9.913334e+03	-42593.189
## teeth-oil	-9.858054e+03	-49231.692
## trophies-oil	-1.003728e+04	-42512.107
## tusks-oil	-1.002776e+04	-42607.739
## wood product-oil	-1.002433e+04	-43602.284
## skin pieces-piano keys	9.270544e+02	-36194.767
## skins-piano keys	-5.127762e+02	-19740.757
## skulls-piano keys	-2.490000e+02	-29596.376
## specimens-piano keys	-1.212797e+02	-19588.127
## teeth-piano keys	-6.600000e+01	-29413.376
## trophies-piano keys	-2.452245e+02	-19365.886
## tusks-piano keys	-2.357027e+02	-19534.419
## wood product-piano keys	-2.322791e+02	-21171.810
## skins-skin pieces	-1.439831e+03	-33977.963

## skulls-skin pieces	-1.176054e+03	-40549.692
## specimens-skin pieces	-1.048334e+03	-33728.189
## teeth-skin pieces	-9.930544e+02	-40366.692
## trophies-skin pieces	-1.172279e+03	-33647.107
## tusks-skin pieces	-1.162757e+03	-33742.739
## wood product-skin pieces	-1.159333e+03	-34737.284
## skulls-skins	2.637762e+02	-23016.451
## specimens-skins	3.914965e+02	-7332.401
## teeth-skins	4.467762e+02	-22833.451
## trophies-skins	2.675517e+02	-6536.870
## tusks-skins	2.770735e+02	-7012.706
## wood product-skins	2.804971e+02	-10635.749
## specimens-skulls	1.277203e+02	-23350.181
## teeth-skulls	1.830000e+02	-31965.440
## trophies-skulls	3.775510e+00	-23187.891
## tusks-skulls	1.329730e+01	-23325.386
## wood product-skulls	1.672093e+01	-24695.982
## teeth-specimens	5.527973e+01	-23422.621
## trophies-specimens	-1.239448e+02	-7576.664
## tusks-specimens	-1.144230e+02	-8012.763
## wood product-specimens	-1.109993e+02	-11442.694
## trophies-teeth	-1.792245e+02	-23370.891
## tusks-teeth	-1.697027e+02	-23508.386
## wood product-teeth	-1.662791e+02	-24878.982
## tusks-trophies	9.521787e+00	-6992.287
## wood product-trophies	1.294542e+01	-10713.137
## wood product-tusks	3.423629e+00	-11036.939
##	upr	p adj
## bodies-baleen	25411.4964	1.0000000
## bones-baleen	39394.6372	1.0000000
## carvings-baleen	23239.3890	1.0000000
## cloth-baleen	39375.6372	1.0000000
## cosmetics-baleen	95119.6916	0.0000639
## eggs-baleen	26998.2220	1.0000000
## feathers-baleen	39364.9444	1.0000000
## feet-baleen	32146.4401	1.0000000
## garments-baleen	26297.7363	1.0000000
## hair-baleen	39599.6372	1.0000000
## horn carvings-baleen	39371.6372	1.0000000
## ivory carvings-baleen	23200.6208	1.0000000
## ivory pieces-baleen	39373.6372	1.0000000
## leather products (large)-baleen	38381.6916	1.0000000
## leather products (small)-baleen	22465.4469	1.0000000
## live-baleen	22809.2495	1.0000000
## oil-baleen	49419.6916	0.9999999

## piano keys-baleen	29601.3764	1.0000000
## skin pieces-baleen	40554.6916	1.0000000
## skins-baleen	23021.4506	1.0000000
## skulls-baleen	32153.4401	1.0000000
## specimens-baleen	23610.6214	1.0000000
## teeth-baleen	32336.4401	1.0000000
## trophies-baleen	23200.4419	1.0000000
## tusks-baleen	23356.9805	1.0000000
## wood product-baleen	24734.4234	1.0000000
## bones-bodies	34123.6472	1.0000000
## carvings-bodies	12893.9726	1.0000000
## cloth-bodies	34104.6472	1.0000000
## cosmetics-bodies	89848.7016	0.0000007
## eggs-bodies	18432.4150	1.0000000
## feathers-bodies	34093.9544	1.0000000
## feet-bodies	25417.6507	1.0000000
## garments-bodies	17731.9294	1.0000000
## hair-bodies	34328.6472	1.0000000
## horn carvings-bodies	34100.6472	1.0000000
## ivory carvings-bodies	12256.0672	1.0000000
## ivory pieces-bodies	34102.6472	1.0000000
## leather products (large)-bodies	33110.7016	1.0000000
## leather products (small)-bodies	11680.0196	1.0000000
## live-bodies	11486.5687	1.0000000
## oil-bodies	44148.7016	0.9999986
## piano keys-bodies	22022.6740	1.0000000
## skin pieces-bodies	35283.7016	1.0000000
## skins-bodies	12171.0055	1.0000000
## skulls-bodies	25424.6507	1.0000000
## specimens-bodies	12929.0222	1.0000000
## teeth-bodies	25607.6507	1.0000000
## trophies-bodies	12271.8316	1.0000000
## tusks-bodies	12557.2581	1.0000000
## wood product-bodies	14963.8983	1.0000000
## carvings-bones	32303.1013	1.0000000
## cloth-bones	45445.7601	1.0000000
## cosmetics-bones	101189.8144	0.0019089
## eggs-bones	35296.7589	1.0000000
## feathers-bones	45435.0672	1.0000000
## feet-bones	39350.6372	1.0000000
## garments-bones	34596.2732	1.0000000
## hair-bones	45669.7601	1.0000000
## horn carvings-bones	45441.7601	1.0000000
## ivory carvings-bones	32467.8850	1.0000000
## ivory pieces-bones	45443.7601	1.0000000

## leather products (large)-bones	44451.8144	1.0000000
## leather products (small)-bones	31681.0345	1.0000000
## live-bones	32192.7121	1.0000000
## oil-bones	55489.8144	1.0000000
## piano keys-bones	37354.8211	1.0000000
## skin pieces-bones	46624.8144	1.0000000
## skins-bones	32258.3562	1.0000000
## skulls-bones	39357.6372	1.0000000
## specimens-bones	32791.5756	1.0000000
## teeth-bones	39540.6372	1.0000000
## trophies-bones	32462.6041	1.0000000
## tusks-bones	32577.2794	1.0000000
## wood product-bones	33578.6715	1.0000000
## cloth-carvings	33645.1060	1.0000000
## cosmetics-carvings	89389.1604	0.0000001
## eggs-carvings	16919.0093	1.0000000
## feathers-carvings	33634.4132	1.0000000
## feet-carvings	24556.3937	1.0000000
## garments-carvings	16218.5236	1.0000000
## hair-carvings	33869.1060	1.0000000
## horn carvings-carvings	33641.1060	1.0000000
## ivory carvings-carvings	9326.9589	1.0000000
## ivory pieces-carvings	33643.1060	1.0000000
## leather products (large)-carvings	32651.1604	1.0000000
## leather products (small)-carvings	8885.8354	1.0000000
## live-carvings	8193.3737	1.0000000
## oil-carvings	43689.1604	0.9999902
## piano keys-carvings	20886.0662	1.0000000
## skin pieces-carvings	34824.1604	1.0000000
## skins-carvings	9322.8203	1.0000000
## skulls-carvings	24563.3937	1.0000000
## specimens-carvings	10218.0725	1.0000000
## teeth-carvings	24746.3937	1.0000000
## trophies-carvings	9356.6722	1.0000000
## tusks-carvings	9751.3292	1.0000000
## wood product-carvings	12861.2261	1.0000000
## cosmetics-cloth	101208.8144	0.0018959
## eggs-cloth	35315.7589	1.0000000
## feathers-cloth	45454.0672	1.0000000
## feet-cloth	39369.6372	1.0000000
## garments-cloth	34615.2732	1.0000000
## hair-cloth	45688.7601	1.0000000
## horn carvings-cloth	45460.7601	1.0000000
## ivory carvings-cloth	32486.8850	1.0000000
## ivory pieces-cloth	45462.7601	1.0000000

## leather products (large)-cloth	44470.8144	1.0000000
## leather products (small)-cloth	31700.0345	1.0000000
## live-cloth	32211.7121	1.0000000
## oil-cloth	55508.8144	1.0000000
## piano keys-cloth	37373.8211	1.0000000
## skin pieces-cloth	46643.8144	1.0000000
## skins-cloth	32277.3562	1.0000000
## skulls-cloth	39376.6372	1.0000000
## specimens-cloth	32810.5756	1.0000000
## teeth-cloth	39559.6372	1.0000000
## trophies-cloth	32481.6041	1.0000000
## tusks-cloth	32596.2794	1.0000000
## wood product-cloth	33597.6715	1.0000000
## eggs-cosmetics	-20428.2955	0.0000023
## feathers-cosmetics	-10289.9871	0.0018885
## feet-cosmetics	-16374.4172	0.0000639
## garments-cosmetics	-21128.7812	0.0000015
## hair-cosmetics	-10055.2943	0.0020554
## horn carvings-cosmetics	-10283.2943	0.0018931
## ivory carvings-cosmetics	-23257.1694	0.0000001
## ivory pieces-cosmetics	-10281.2943	0.0018945
## leather products (large)-cosmetics	-11273.2399	0.0013185
## leather products (small)-cosmetics	-24044.0199	0.0000001
## live-cosmetics	-23532.3423	0.0000001
## oil-cosmetics	-235.2399	0.0469014
## piano keys-cosmetics	-18370.2332	0.0000134
## skin pieces-cosmetics	-9100.2399	0.0028881
## skins-cosmetics	-23466.6982	0.0000001
## skulls-cosmetics	-16367.4172	0.0000641
## specimens-cosmetics	-22933.4788	0.0000002
## teeth-cosmetics	-16184.4172	0.0000701
## trophies-cosmetics	-23262.4503	0.0000001
## tusks-cosmetics	-23147.7749	0.0000001
## wood product-cosmetics	-22146.3828	0.0000004
## feathers-eggs	35107.2517	1.0000000
## feet-eggs	26794.4076	1.0000000
## garments-eggs	19631.9731	1.0000000
## hair-eggs	35341.9445	1.0000000
## horn carvings-eggs	35113.9445	1.0000000
## ivory carvings-eggs	14991.3966	1.0000000
## ivory pieces-eggs	35115.9445	1.0000000
## leather products (large)-eggs	34123.9989	1.0000000
## leather products (small)-eggs	14352.4265	1.0000000
## live-eggs	14376.1354	1.0000000
## oil-eggs	45161.9989	0.9999994

## piano keys-eggs	23630.9939	1.0000000
## skin pieces-eggs	36296.9989	1.0000000
## skins-eggs	14868.9836	1.0000000
## skulls-eggs	26801.4076	1.0000000
## specimens-eggs	15560.9850	1.0000000
## teeth-eggs	26984.4076	1.0000000
## trophies-eggs	15000.8048	1.0000000
## tusks-eggs	15235.2709	1.0000000
## wood product-eggs	17260.3929	1.0000000
## feet-feathers	39380.3300	1.0000000
## garments-feathers	34625.9660	1.0000000
## hair-feathers	45699.4529	1.0000000
## horn carvings-feathers	45471.4529	1.0000000
## ivory carvings-feathers	32497.5778	1.0000000
## ivory pieces-feathers	45473.4529	1.0000000
## leather products (large)-feathers	44481.5073	1.0000000
## leather products (small)-feathers	31710.7273	1.0000000
## live-feathers	32222.4049	1.0000000
## oil-feathers	55519.5073	1.0000000
## piano keys-feathers	37384.5139	1.0000000
## skin pieces-feathers	46654.5073	1.0000000
## skins-feathers	32288.0490	1.0000000
## skulls-feathers	39387.3300	1.0000000
## specimens-feathers	32821.2684	1.0000000
## teeth-feathers	39570.3300	1.0000000
## trophies-feathers	32492.2969	1.0000000
## tusks-feathers	32606.9722	1.0000000
## wood product-feathers	33608.3644	1.0000000
## garments-feet	26299.7363	1.0000000
## hair-feet	39601.6372	1.0000000
## horn carvings-feet	39373.6372	1.0000000
## ivory carvings-feet	23202.6208	1.0000000
## ivory pieces-feet	39375.6372	1.0000000
## leather products (large)-feet	38383.6916	1.0000000
## leather products (small)-feet	22467.4469	1.0000000
## live-feet	22811.2495	1.0000000
## oil-feet	49421.6916	0.9999999
## piano keys-feet	29603.3764	1.0000000
## skin pieces-feet	40556.6916	1.0000000
## skins-feet	23023.4506	1.0000000
## skulls-feet	32155.4401	1.0000000
## specimens-feet	23612.6214	1.0000000
## teeth-feet	32338.4401	1.0000000
## trophies-feet	23202.4419	1.0000000
## tusks-feet	23358.9805	1.0000000

## wood product-feet	24736.4234	1.0000000
## hair-garments	36042.4302	1.0000000
## horn carvings-garments	35814.4302	1.0000000
## ivory carvings-garments	15691.8823	1.0000000
## ivory pieces-garments	35816.4302	1.0000000
## leather products (large)-garments	34824.4846	1.0000000
## leather products (small)-garments	15052.9122	1.0000000
## live-garments	15076.6211	1.0000000
## oil-garments	45862.4846	0.9999976
## piano keys-garments	24331.4796	1.0000000
## skin pieces-garments	36997.4846	1.0000000
## skins-garments	15569.4693	1.0000000
## skulls-garments	27501.8933	1.0000000
## specimens-garments	16261.4707	1.0000000
## teeth-garments	27684.8933	1.0000000
## trophies-garments	15701.2904	1.0000000
## tusks-garments	15935.7566	1.0000000
## wood product-garments	17960.8786	1.0000000
## horn carvings-hair	45236.7601	1.0000000
## ivory carvings-hair	32262.8850	1.0000000
## ivory pieces-hair	45238.7601	1.0000000
## leather products (large)-hair	44246.8144	1.0000000
## leather products (small)-hair	31476.0345	1.0000000
## live-hair	31987.7121	1.0000000
## oil-hair	55284.8144	1.0000000
## piano keys-hair	37149.8211	1.0000000
## skin pieces-hair	46419.8144	1.0000000
## skins-hair	32053.3562	1.0000000
## skulls-hair	39152.6372	1.0000000
## specimens-hair	32586.5756	1.0000000
## teeth-hair	39335.6372	1.0000000
## trophies-hair	32257.6041	1.0000000
## tusks-hair	32372.2794	1.0000000
## wood product-hair	33373.6715	1.0000000
## ivory carvings-horn carvings	32490.8850	1.0000000
## ivory pieces-horn carvings	45466.7601	1.0000000
## leather products (large)-horn carvings	44474.8144	1.0000000
## leather products (small)-horn carvings	31704.0345	1.0000000
## live-horn carvings	32215.7121	1.0000000
## oil-horn carvings	55512.8144	1.0000000
## piano keys-horn carvings	37377.8211	1.0000000
## skin pieces-horn carvings	46647.8144	1.0000000
## skins-horn carvings	32281.3562	1.0000000
## skulls-horn carvings	39380.6372	1.0000000
## specimens-horn carvings	32814.5756	1.0000000

## teeth-horn carvings	39563.6372	1.0000000
## trophies-horn carvings	32485.6041	1.0000000
## tusks-horn carvings	32600.2794	1.0000000
## wood product-horn carvings	33601.6715	1.0000000
## ivory pieces-ivory carvings	32435.2968	1.0000000
## leather products (large)-ivory carvings	31443.3512	1.0000000
## leather products (small)-ivory carvings	6081.5016	1.0000000
## live-ivory carvings	4708.1863	1.0000000
## oil-ivory carvings	42481.3512	0.9999964
## piano keys-ivory carvings	19326.2253	1.0000000
## skin pieces-ivory carvings	33616.3512	1.0000000
## skins-ivory carvings	6457.7968	1.0000000
## skulls-ivory carvings	23152.0326	1.0000000
## specimens-ivory carvings	7502.9446	1.0000000
## teeth-ivory carvings	23335.0326	1.0000000
## trophies-ivory carvings	6412.9557	1.0000000
## tusks-ivory carvings	6933.9936	1.0000000
## wood product-ivory carvings	10682.3823	1.0000000
## leather products (large)-ivory pieces	44472.8144	1.0000000
## leather products (small)-ivory pieces	31702.0345	1.0000000
## live-ivory pieces	32213.7121	1.0000000
## oil-ivory pieces	55510.8144	1.0000000
## piano keys-ivory pieces	37375.8211	1.0000000
## skin pieces-ivory pieces	46645.8144	1.0000000
## skins-ivory pieces	32279.3562	1.0000000
## skulls-ivory pieces	39378.6372	1.0000000
## specimens-ivory pieces	32812.5756	1.0000000
## teeth-ivory pieces	39561.6372	1.0000000
## trophies-ivory pieces	32483.6041	1.0000000
## tusks-ivory pieces	32598.2794	1.0000000
## wood product-ivory pieces	33599.6715	1.0000000
## leather products (small)-leather products (large)	32693.9801	1.0000000
## live-leather products (large)	33205.6577	1.0000000
## oil-leather products (large)	56502.7601	1.0000000
## piano keys-leather products (large)	38367.7668	1.0000000
## skin pieces-leather products (large)	47637.7601	1.0000000
## skins-leather products (large)	33271.3018	1.0000000
## skulls-leather products (large)	40370.5828	1.0000000
## specimens-leather products (large)	33804.5212	1.0000000
## teeth-leather products (large)	40553.5828	1.0000000
## trophies-leather products (large)	33475.5497	1.0000000
## tusks-leather products (large)	33590.2251	1.0000000
## wood product-leather products (large)	34591.6172	1.0000000
## live-leather products (small)	6450.9109	1.0000000
## oil-leather products (small)	43527.7956	0.9999812

## piano keys-leather products (small)	20462.6616	1.0000000
## skin pieces-leather products (small)	34662.7956	1.0000000
## skins-leather products (small)	7973.8838	1.0000000
## skulls-leather products (small)	24250.1537	1.0000000
## specimens-leather products (small)	8969.8808	1.0000000
## teeth-leather products (small)	24433.1537	1.0000000
## trophies-leather products (small)	7955.6283	1.0000000
## tusks-leather products (small)	8434.2375	1.0000000
## wood product-leather products (small)	11987.0208	1.0000000
## oil-live	42185.3036	0.9999958
## piano keys-live	18826.2044	1.0000000
## skin pieces-live	33320.3036	1.0000000
## skins-live	4901.2572	1.0000000
## skulls-live	22739.7866	1.0000000
## specimens-live	6116.6551	1.0000000
## teeth-live	22922.7866	1.0000000
## trophies-live	4756.5199	1.0000000
## tusks-live	5434.2059	1.0000000
## wood product-live	9770.2070	1.0000000
## piano keys-oil	27329.7668	0.9999999
## skin pieces-oil	36599.7601	1.0000000
## skins-oil	22233.3018	0.9999940
## skulls-oil	29332.5828	0.9999999
## specimens-oil	22766.5212	0.9999975
## teeth-oil	29515.5828	1.0000000
## trophies-oil	22437.5497	0.9999963
## tusks-oil	22552.2251	0.9999966
## wood product-oil	23553.6172	0.9999982
## skin pieces-piano keys	38048.8755	1.0000000
## skins-piano keys	18715.2050	1.0000000
## skulls-piano keys	29098.3764	1.0000000
## specimens-piano keys	19345.5675	1.0000000
## teeth-piano keys	29281.3764	1.0000000
## trophies-piano keys	18875.4369	1.0000000
## tusks-piano keys	19063.0132	1.0000000
## wood product-piano keys	20707.2521	1.0000000
## skins-skin pieces	31098.3018	1.0000000
## skulls-skin pieces	38197.5828	1.0000000
## specimens-skin pieces	31631.5212	1.0000000
## teeth-skin pieces	38380.5828	1.0000000
## trophies-skin pieces	31302.5497	1.0000000
## tusks-skin pieces	31417.2251	1.0000000
## wood product-skin pieces	32418.6172	1.0000000
## skulls-skins	23544.0030	1.0000000
## specimens-skins	8115.3944	1.0000000

```
## teeth-skins                23727.0030 1.0000000
## trophies-skins             7071.9730 1.0000000
## tusks-skins                7566.8534 1.0000000
## wood product-skins         11196.7429 1.0000000
## specimens-skulls           23605.6214 1.0000000
## teeth-skulls               32331.4401 1.0000000
## trophies-skulls            23195.4419 1.0000000
## tusks-skulls               23351.9805 1.0000000
## wood product-skulls        24729.4234 1.0000000
## teeth-specimens            23533.1809 1.0000000
## trophies-specimens         7328.7749 1.0000000
## tusks-specimens            7783.9169 1.0000000
## wood product-specimens     11220.6953 1.0000000
## trophies-teeth             23012.4419 1.0000000
## tusks-teeth                23168.9805 1.0000000
## wood product-teeth         24546.4234 1.0000000
## tusks-trophies             7011.3303 1.0000000
## wood product-trophies      10739.0283 1.0000000
## wood product-tusks         11043.7858 1.0000000
```

```
# check interaction between the variables
```

```
Poaching.2way3 <- aov(data = CITES2016_Processed, Reported_quantity ~ Class * Appendix)
summary(Poaching.2way3)
```

```
##              Df      Sum Sq   Mean Sq F value Pr(>F)
## Class         13 1.463e+10  1.125e+09   1.748 0.0453 *
## Appendix       2 8.712e+10  4.356e+10  67.690 <2e-16 ***
## Class:Appendix  8 3.787e+11  4.734e+10  73.564 <2e-16 ***
## Residuals     6777 4.361e+12  6.435e+08
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 53958 observations deleted due to missingness
```

```
# Interaction is not significant between variables
```

```
# 2. How Does Reported Poaching Quantity vary over Class and Appendix for
# entire data
```

```
Poaching.2way.test <- aov(data = CITES2016_Processed, Reported_quantity ~ Class +
  Appendix)
summary(Poaching.2way.test)
```



```
##           Df      Sum Sq   Mean Sq F value Pr(>F)
## Class      13 1.463e+10 1.125e+09    1.61 0.0745 .
## Appendix    2 8.712e+10 4.356e+10   62.35 <2e-16 ***
## Residuals 6785 4.740e+12 6.986e+08
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 53958 observations deleted due to missingness

# P-value is small. Reject our null hypothesis that the mean across our groups
# is different. Not enough information to tell us which groups are differing

Poaching.2way2lm.test <- lm(data = CITES2016_Processed, Reported_quantity ~ Class +
  Appendix)
summary(Poaching.2way2lm.test)

##
## Call:
## lm(formula = Reported_quantity ~ Class + Appendix, data = CITES2016_Processed)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -31209   -2443   -2022   -761 1288663
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)      13105       3274   4.002 6.35e-05 ***
## ClassAmphibia     -13713       4232  -3.240 0.001202 **
## ClassAnthozoa      -11972       3380  -3.542 0.000400 ***
## ClassArachnida     -13015      10520  -1.237 0.216079
## ClassAves          -11703       3350  -3.493 0.000480 ***
## ClassBivalvia      -13445       5845  -2.300 0.021456 *
## ClassCoelacanthi   -13103      26632  -0.492 0.622749
## ClassElasmobranchii -13968      12272  -1.138 0.255043
## ClassGastropoda       2839       8312   0.342 0.732683
## ClassHirudinoidea   -11188      18978  -0.590 0.555539
## ClassHydrozoa       -13835       7049  -1.963 0.049712 *
## ClassInsecta        -13527       5138  -2.633 0.008492 **
## ClassMammalia       -14989       3374  -4.442 9.03e-06 ***
## ClassReptilia       -11495       3322  -3.461 0.000542 ***
## AppendixII           883       1215   0.727 0.467556
## AppendixIII        29602       2777  10.659 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 26430 on 6785 degrees of freedom
```

```
## (53958 observations deleted due to missingness)
## Multiple R-squared: 0.02101, Adjusted R-squared: 0.01885
## F-statistic: 9.71 on 15 and 6785 DF, p-value: < 2.2e-16
```

```
# means are different. Reject null
```

```
TukeyHSD(Poaching.2way.test)
```

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = Reported_quantity ~ Class + Appendix, data = CITES2016_Processed)
##
## $Class
```

	diff	lwr	upr	p adj
## Amphibia-Actinopteri	-12944.04086	-26971.327	1083.2455	0.1070969
## Anthozoa-Actinopteri	-11235.95598	-22350.741	-121.1712	0.0445431
## Arachnida-Actinopteri	-12527.11301	-47748.305	22694.0794	0.9959387
## Aves-Actinopteri	-10987.64711	-22136.056	160.7616	0.0580844
## Bivalvia-Actinopteri	-12957.77015	-32436.582	6521.0413	0.6061167
## Coelacanthi-Actinopteri	-13497.97015	-102826.805	75830.8651	0.9999998
## Elasmobranchii-Actinopteri	-13480.77015	-54588.024	27626.4833	0.9981976
## Gastropoda-Actinopteri	3326.77985	-24467.802	31121.3612	1.0000000
## Hirudinoidea-Actinopteri	-10699.97015	-74327.749	52927.8086	0.9999991
## Hydrozoa-Actinopteri	-13347.69237	-36887.907	10192.5226	0.8257038
## Insecta-Actinopteri	-13039.12570	-30129.043	4050.7919	0.3669473
## Mammalia-Actinopteri	-12916.68103	-24167.268	-1666.0943	0.0088847
## Reptilia-Actinopteri	-10809.15892	-21752.623	134.3051	0.0568147
## Anthozoa-Amphibia	1708.08488	-7544.368	10960.5378	0.9999973
## Arachnida-Amphibia	416.92785	-34261.622	35095.4779	1.0000000
## Aves-Amphibia	1956.39374	-7336.424	11249.2114	0.9999869
## Bivalvia-Amphibia	-13.72929	-18493.273	18465.8145	1.0000000
## Coelacanthi-Amphibia	-553.92929	-89670.203	88562.3444	1.0000000
## Elasmobranchii-Amphibia	-536.72929	-41180.003	40106.5448	1.0000000
## Gastropoda-Amphibia	16270.82071	-10832.836	43374.4772	0.7591836
## Hirudinoidea-Amphibia	2244.07071	-61084.941	65573.0820	1.0000000
## Hydrozoa-Amphibia	-403.65152	-23123.932	22316.6294	1.0000000
## Insecta-Amphibia	-95.08485	-16036.689	15846.5188	1.0000000
## Mammalia-Amphibia	27.35982	-9387.795	9442.5149	1.0000000
## Reptilia-Amphibia	2134.88194	-6911.048	11180.8119	0.9999505
## Arachnida-Anthozoa	-1291.15703	-34897.340	32315.0257	1.0000000
## Aves-Anthozoa	248.30886	-3375.245	3871.8624	1.0000000
## Bivalvia-Anthozoa	-1721.81417	-18100.679	14657.0509	1.0000000
## Coelacanthi-Anthozoa	-2262.01417	-90966.489	86442.4610	1.0000000
## Elasmobranchii-Anthozoa	-2244.81417	-41977.035	37487.4071	1.0000000

## Gastropoda-Anthozoa	14562.73583	-11154.610	40280.0817	0.8270863
## Hirudinoidea-Anthozoa	535.98583	-62212.220	63284.1918	1.0000000
## Hydrozoa-Anthozoa	-2111.73640	-23158.942	18935.4688	1.0000000
## Insecta-Anthozoa	-1803.16973	-15253.389	11647.0499	0.9999999
## Mammalia-Anthozoa	-1680.72506	-5607.406	2245.9562	0.9777372
## Reptilia-Anthozoa	426.79706	-2506.210	3359.8038	0.9999999
## Aves-Arachnida	1539.46589	-32077.852	35156.7842	1.0000000
## Bivalvia-Arachnida	-430.65714	-37649.754	36788.4397	1.0000000
## Coelacanthi-Arachnida	-970.85714	-95762.618	93820.9034	1.0000000
## Elasmobranchii-Arachnida	-953.65714	-52873.243	50965.9284	1.0000000
## Gastropoda-Arachnida	15853.89286	-26316.901	58024.6864	0.9930787
## Hirudinoidea-Arachnida	1827.14286	-69266.678	72920.9633	1.0000000
## Hydrozoa-Arachnida	-820.57937	-40317.146	38675.9875	1.0000000
## Insecta-Arachnida	-512.01270	-36538.425	35514.3993	1.0000000
## Mammalia-Arachnida	-389.56803	-34040.909	33261.7734	1.0000000
## Reptilia-Arachnida	1717.95409	-31831.956	35267.8644	1.0000000
## Bivalvia-Aves	-1970.12304	-18371.824	14431.5780	1.0000000
## Coelacanthi-Aves	-2510.32304	-91219.018	86198.3716	1.0000000
## Elasmobranchii-Aves	-2493.12304	-42234.763	37248.5174	1.0000000
## Gastropoda-Aves	14314.42696	-11417.469	40046.3226	0.8447708
## Hirudinoidea-Aves	287.67696	-62466.494	63041.8476	1.0000000
## Hydrozoa-Aves	-2360.04526	-23425.026	18704.9357	1.0000000
## Insecta-Aves	-2051.47859	-15529.497	11426.5399	0.9999997
## Mammalia-Aves	-1929.03392	-5949.905	2091.8369	0.9440651
## Reptilia-Aves	178.48820	-2879.469	3236.4458	1.0000000
## Coelacanthi-Bivalvia	-540.20000	-90675.485	89595.0849	1.0000000
## Elasmobranchii-Bivalvia	-523.00000	-43354.473	42308.4728	1.0000000
## Gastropoda-Bivalvia	16284.55000	-14001.875	46570.9749	0.8748846
## Hirudinoidea-Bivalvia	2257.80000	-62497.300	67012.9002	1.0000000
## Hydrozoa-Bivalvia	-389.92222	-26826.081	26046.2368	1.0000000
## Insecta-Bivalvia	-81.35556	-20980.974	20818.2632	1.0000000
## Mammalia-Bivalvia	41.08912	-16430.234	16512.4121	1.0000000
## Reptilia-Bivalvia	2148.61123	-14114.481	18411.7039	1.0000000
## Elasmobranchii-Coelacanthi	17.20000	-97115.450	97149.8504	1.0000000
## Gastropoda-Coelacanthi	16824.75000	-75465.467	109114.9674	0.9999977
## Hirudinoidea-Coelacanthi	2798.00000	-105799.605	111395.6045	1.0000000
## Hydrozoa-Coelacanthi	150.27778	-90949.048	91249.6038	1.0000000
## Insecta-Coelacanthi	458.84444	-89190.532	90108.2213	1.0000000
## Mammalia-Coelacanthi	581.28912	-88140.305	89302.8828	1.0000000
## Reptilia-Coelacanthi	2688.81123	-85994.360	91371.9826	1.0000000
## Gastropoda-Elasmobranchii	16807.55000	-30390.434	64005.5343	0.9958896
## Hirudinoidea-Elasmobranchii	2780.80000	-71405.487	76967.0871	1.0000000
## Hydrozoa-Elasmobranchii	133.07778	-44691.611	44957.7662	1.0000000
## Insecta-Elasmobranchii	441.64444	-41357.593	42240.8819	1.0000000
## Mammalia-Elasmobranchii	564.08912	-39206.335	40334.5137	1.0000000

```
## Reptilia-Elasmobranchii      2671.61123 -37013.025  42356.2477 1.0000000
## Hirudinoidea-Gastropoda     -14026.75000 -81749.255  53695.7549 0.9999892
## Hydrozoa-Gastropoda         -16674.47222 -49719.671  16370.7265 0.9188871
## Insecta-Gastropoda          -16365.90556 -45174.042  12442.2308 0.8237102
## Mammalia-Gastropoda         -16243.46088 -42019.790   9532.8682 0.6916709
## Reptilia-Gastropoda         -14135.93877 -39779.707  11507.8293 0.8533184
## Hydrozoa-Hirudinoidea       -2647.72222 -68738.120  63442.6752 1.0000000
## Insecta-Hirudinoidea        -2339.15556 -66416.173  61737.8621 1.0000000
## Mammalia-Hirudinoidea       -2216.71088 -64989.114  60555.6924 1.0000000
## Reptilia-Hirudinoidea       -109.18877 -62827.275  62608.8973 1.0000000
## Insecta-Hydrozoa           308.56667 -24420.196  25037.3290 1.0000000
## Mammalia-Hydrozoa           431.01134 -20688.224  21550.2468 1.0000000
## Reptilia-Hydrozoa           2538.53346 -18418.704  23495.7711 1.0000000
## Mammalia-Insecta            122.44467 -13440.212  13685.1018 1.0000000
## Reptilia-Insecta            2229.96679 -11079.029  15538.9627 0.9999992
## Reptilia-Mammalia           2107.52212 -1304.192   5519.2358 0.7205625
```

```
##
```

```
## $Appendix
```

```
##           diff          lwr          upr          p adj
## II-I      1229.498 -1405.787  3864.783 0.5179994
## III-I     29383.421 22913.602 35853.240 0.0000000
## III-II    28153.923 22139.310 34168.535 0.0000000
```

```
# check interaction between the variables
```

```
Poaching.2way3 <- aov(data = CITES2016_Processed, Reported_quantity ~ Class * Appendix)
summary(Poaching.2way3)
```

```
##           Df      Sum Sq   Mean Sq F value Pr(>F)
## Class      13 1.463e+10  1.125e+09   1.748 0.0453 *
## Appendix    2 8.712e+10  4.356e+10  67.690 <2e-16 ***
## Class:Appendix 8 3.787e+11  4.734e+10  73.564 <2e-16 ***
## Residuals  6777 4.361e+12  6.435e+08
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 53958 observations deleted due to missingness
```

```
# significant because the pvalue is <2e-16
```

```
TukeyHSD(Poaching.2way3)
```

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = Reported_quantity ~ Class * Appendix, data = CITES2016_Processed)
##
```

## \$Class		diff	lwr	upr	p adj
## Amphibia-Actinopteri	-12944.04086	-26407.209	519.1272	0.0740718	
## Anthozoa-Actinopteri	-11235.95598	-21903.751	-568.1609	0.0279212	
## Arachnida-Actinopteri	-12527.11301	-46331.858	21277.6317	0.9939623	
## Aves-Actinopteri	-10987.64711	-21687.714	-287.5803	0.0374741	
## Bivalvia-Actinopteri	-12957.77015	-31653.226	5737.6858	0.5359909	
## Coelacanthi-Actinopteri	-13497.97015	-99234.377	72238.4364	0.9999996	
## Elasmobranchii-Actinopteri	-13480.77015	-52934.863	25973.3231	0.9972696	
## Gastropoda-Actinopteri	3326.77985	-23350.021	30003.5805	1.0000000	
## Hirudinoidea-Actinopteri	-10699.97015	-71768.908	50368.9679	0.9999986	
## Hydrozoa-Actinopteri	-13347.69237	-35941.219	9245.8346	0.7793038	
## Insecta-Actinopteri	-13039.12570	-29441.759	3363.5076	0.2984291	
## Mammalia-Actinopteri	-12916.68103	-23714.817	-2118.5454	0.0047290	
## Reptilia-Actinopteri	-10809.15892	-21312.523	-305.7948	0.0365661	
## Anthozoa-Amphibia	1708.08488	-7172.273	10588.4432	0.9999955	
## Arachnida-Amphibia	416.92785	-32866.997	33700.8531	1.0000000	
## Aves-Amphibia	1956.39374	-6962.706	10875.4935	0.9999788	
## Bivalvia-Amphibia	-13.72929	-17750.104	17722.6453	1.0000000	
## Coelacanthi-Amphibia	-553.92929	-86086.323	84978.4641	1.0000000	
## Elasmobranchii-Amphibia	-536.72929	-39545.502	38472.0439	1.0000000	
## Gastropoda-Amphibia	16270.82071	-9742.841	42284.4826	0.7026954	
## Hirudinoidea-Amphibia	2244.07071	-58538.115	63026.2565	1.0000000	
## Hydrozoa-Amphibia	-403.65152	-22210.219	21402.9156	1.0000000	
## Insecta-Amphibia	-95.08485	-15395.585	15205.4148	1.0000000	
## Mammalia-Amphibia	27.35982	-9009.158	9063.8772	1.0000000	
## Reptilia-Amphibia	2134.88194	-6547.259	10817.0228	0.9999208	
## Arachnida-Anthozoa	-1291.15703	-33545.841	30963.5269	1.0000000	
## Aves-Anthozoa	248.30886	-3229.521	3726.1384	1.0000000	
## Bivalvia-Anthozoa	-1721.81417	-17441.990	13998.3621	1.0000000	
## Coelacanthi-Anthozoa	-2262.01417	-87399.170	82875.1415	1.0000000	
## Elasmobranchii-Anthozoa	-2244.81417	-40379.173	35889.5449	1.0000000	
## Gastropoda-Anthozoa	14562.73583	-10120.367	39245.8386	0.7809272	
## Hirudinoidea-Anthozoa	535.98583	-59688.752	60760.7238	1.0000000	
## Hydrozoa-Anthozoa	-2111.73640	-22312.512	18089.0390	1.0000000	
## Insecta-Anthozoa	-1803.16973	-14712.478	11106.1388	0.9999999	
## Mammalia-Anthozoa	-1680.72506	-5449.492	2088.0416	0.9686032	
## Reptilia-Anthozoa	426.79706	-2388.257	3241.8506	0.9999998	
## Aves-Arachnida	1539.46589	-30725.906	33804.8376	1.0000000	
## Bivalvia-Arachnida	-430.65714	-36152.959	35291.6448	1.0000000	
## Coelacanthi-Arachnida	-970.85714	-91950.493	90008.7790	1.0000000	
## Elasmobranchii-Arachnida	-953.65714	-50785.256	48877.9418	1.0000000	
## Gastropoda-Arachnida	15853.89286	-24620.969	56328.7551	0.9898565	
## Hirudinoidea-Arachnida	1827.14286	-66407.584	70061.8700	1.0000000	
## Hydrozoa-Arachnida	-820.57937	-38728.761	37087.6024	1.0000000	

## Insecta-Arachnida	-512.01270	-35089.594	34065.5691	1.0000000
## Mammalia-Arachnida	-389.56803	-32687.595	31908.4585	1.0000000
## Reptilia-Arachnida	1717.95409	-30482.720	33918.6286	1.0000000
## Bivalvia-Aves	-1970.12304	-17712.217	13771.9708	1.0000000
## Coelacanthi-Aves	-2510.32304	-87651.528	82630.8823	1.0000000
## Elasmobranchii-Aves	-2493.12304	-40636.522	35650.2764	1.0000000
## Gastropoda-Aves	14314.42696	-10382.640	39011.4944	0.8018144
## Hirudinoidea-Aves	287.67696	-59942.786	60518.1397	1.0000000
## Hydrozoa-Aves	-2360.04526	-22577.882	17857.7911	1.0000000
## Insecta-Aves	-2051.47859	-14987.468	10884.5109	0.9999996
## Mammalia-Aves	-1929.03392	-5788.202	1930.1344	0.9241948
## Reptilia-Aves	178.48820	-2756.491	3113.4677	1.0000000
## Coelacanthi-Bivalvia	-540.20000	-87050.624	85970.2242	1.0000000
## Elasmobranchii-Bivalvia	-523.00000	-41631.972	40585.9718	1.0000000
## Gastropoda-Bivalvia	16284.55000	-12783.883	45352.9827	0.8379379
## Hirudinoidea-Bivalvia	2257.80000	-59893.123	64408.7235	1.0000000
## Hydrozoa-Bivalvia	-389.92222	-25762.930	24983.0860	1.0000000
## Insecta-Bivalvia	-81.35556	-20140.480	19977.7687	1.0000000
## Mammalia-Bivalvia	41.08912	-15767.827	15850.0050	1.0000000
## Reptilia-Bivalvia	2148.61123	-13460.449	17757.6710	0.9999999
## Elasmobranchii-Coelacanthi	17.20000	-93209.185	93243.5852	1.0000000
## Gastropoda-Coelacanthi	16824.75000	-71753.944	105403.4445	0.9999962
## Hirudinoidea-Coelacanthi	2798.00000	-101432.267	107028.2673	1.0000000
## Hydrozoa-Coelacanthi	150.27778	-87285.418	87585.9735	1.0000000
## Insecta-Coelacanthi	458.84444	-85585.213	86502.9018	1.0000000
## Mammalia-Coelacanthi	581.28912	-84572.297	85734.8748	1.0000000
## Reptilia-Coelacanthi	2688.81123	-82427.897	87805.5198	1.0000000
## Gastropoda-Elasmobranchii	16807.55000	-28492.331	62107.4306	0.9938911
## Hirudinoidea-Elasmobranchii	2780.80000	-68422.028	73983.6278	1.0000000
## Hydrozoa-Elasmobranchii	133.07778	-42888.951	43155.1064	1.0000000
## Insecta-Elasmobranchii	441.64444	-39676.604	40559.8930	1.0000000
## Mammalia-Elasmobranchii	564.08912	-37606.937	38735.1151	1.0000000
## Reptilia-Elasmobranchii	2671.61123	-35417.077	40760.2992	1.0000000
## Hirudinoidea-Gastropoda	-14026.75000	-79025.742	50972.2416	0.9999825
## Hydrozoa-Gastropoda	-16674.47222	-48390.733	15041.7881	0.8921839
## Insecta-Gastropoda	-16365.90556	-44015.500	11283.6892	0.7769653
## Mammalia-Gastropoda	-16243.46088	-40983.175	8496.2530	0.6276439
## Reptilia-Gastropoda	-14135.93877	-38748.423	10476.5452	0.8119941
## Hydrozoa-Hirudinoidea	-2647.72222	-66080.243	60784.7984	1.0000000
## Insecta-Hirudinoidea	-2339.15556	-63839.266	59160.9550	1.0000000
## Mammalia-Hirudinoidea	-2216.71088	-62464.673	58031.2513	1.0000000
## Reptilia-Hirudinoidea	-109.18877	-60305.018	60086.6406	1.0000000
## Insecta-Hydrozoa	308.56667	-23425.709	24042.8426	1.0000000
## Mammalia-Hydrozoa	431.01134	-19838.898	20700.9203	1.0000000
## Reptilia-Hydrozoa	2538.53346	-17575.893	22652.9595	1.0000000

```

## Mammalia-Insecta          122.44467  -12894.780  13139.6690  1.0000000
## Reptilia-Insecta          2229.96679  -10543.797  15003.7311  0.9999986
## Reptilia-Mammalia         2107.52212   -1166.987   5382.0310  0.6594516
##
## $Appendix
##           diff           lwr           upr           p adj
## II-I      1229.498 -1299.807  3758.803  0.4897286
## III-I     29383.421 23173.792 35593.050  0.0000000
## III-II    28153.923 22381.194 33926.652  0.0000000
##
## $`Class:Appendix`
##                               diff           lwr           upr
## Amphibia:I-Actinopteri:I      -1.128759e+04 -111872.226  89297.037
## Anthozoa:I-Actinopteri:I              NA              NA              NA
## Arachnida:I-Actinopteri:I              NA              NA              NA
## Aves:I-Actinopteri:I           -1.123236e+04 -28823.557   6358.833
## Bivalvia:I-Actinopteri:I              NA              NA              NA
## Coelacanthi:I-Actinopteri:I      -1.128759e+04 -111872.226  89297.037
## Elasmobranchii:I-Actinopteri:I              NA              NA              NA
## Gastropoda:I-Actinopteri:I              NA              NA              NA
## Hirudinoidea:I-Actinopteri:I              NA              NA              NA
## Hydrozoa:I-Actinopteri:I              NA              NA              NA
## Insecta:I-Actinopteri:I              NA              NA              NA
## Mammalia:I-Actinopteri:I          -1.124305e+04 -28839.659   6353.549
## Reptilia:I-Actinopteri:I          -1.025311e+04 -29032.257   8526.038
## Actinopteri:II-Actinopteri:I       4.936505e+03 -19448.149  29321.160
## Amphibia:II-Actinopteri:I         -1.072429e+04 -29902.420   8453.849
## Anthozoa:II-Actinopteri:I         -9.006620e+03 -25561.631   7548.391
## Arachnida:II-Actinopteri:I        -1.031674e+04 -51225.576  30592.101
## Aves:II-Actinopteri:I            -1.118484e+04 -27837.914   5468.237
## Bivalvia:II-Actinopteri:I        -1.074739e+04 -35132.049  13637.260
## Coelacanthi:II-Actinopteri:I              NA              NA              NA
## Elasmobranchii:II-Actinopteri:I     -1.127039e+04 -58561.501  36020.712
## Gastropoda:II-Actinopteri:I         5.537155e+03 -27434.993  38509.304
## Hirudinoidea:II-Actinopteri:I      -8.489595e+03 -80543.435  63564.246
## Hydrozoa:II-Actinopteri:I         -1.113732e+04 -39659.642  17385.008
## Insecta:II-Actinopteri:I          -1.082875e+04 -32854.997  11197.497
## Mammalia:II-Actinopteri:I         -1.060114e+04 -27438.482   6236.205
## Reptilia:II-Actinopteri:I         -8.623772e+03 -25037.220   7789.676
## Actinopteri:III-Actinopteri:I              NA              NA              NA
## Amphibia:III-Actinopteri:I        -1.108959e+04 -111674.226  89495.037
## Anthozoa:III-Actinopteri:I        -1.119569e+04 -45280.749  22889.378
## Arachnida:III-Actinopteri:I              NA              NA              NA
## Aves:III-Actinopteri:I           1.599782e+05  130280.863 189675.573
## Bivalvia:III-Actinopteri:I              NA              NA              NA

```

## Coelacanthi:III-Actinopteri:I	NA	NA	NA
## Elasmobranchii:III-Actinopteri:I	NA	NA	NA
## Gastropoda:III-Actinopteri:I	NA	NA	NA
## Hirudinoidea:III-Actinopteri:I	NA	NA	NA
## Hydrozoa:III-Actinopteri:I	NA	NA	NA
## Insecta:III-Actinopteri:I	NA	NA	NA
## Mammalia:III-Actinopteri:I	-9.562014e+03	-30743.853	11619.824
## Reptilia:III-Actinopteri:I	1.653405e+03	-23745.993	27052.804
## Anthozoa:I-Amphibia:I	NA	NA	NA
## Arachnida:I-Amphibia:I	NA	NA	NA
## Aves:I-Amphibia:I	5.523246e+01	-99414.514	99524.979
## Bivalvia:I-Amphibia:I	NA	NA	NA
## Coelacanthi:I-Amphibia:I	4.819123e-11	-140363.985	140363.985
## Elasmobranchii:I-Amphibia:I	NA	NA	NA
## Gastropoda:I-Amphibia:I	NA	NA	NA
## Hirudinoidea:I-Amphibia:I	NA	NA	NA
## Hydrozoa:I-Amphibia:I	NA	NA	NA
## Insecta:I-Amphibia:I	NA	NA	NA
## Mammalia:I-Amphibia:I	4.453965e+01	-99426.163	99515.243
## Reptilia:I-Amphibia:I	1.034485e+03	-98652.207	100721.178
## Actinopteri:II-Amphibia:I	1.622410e+04	-84668.871	117117.071
## Amphibia:II-Amphibia:I	5.633093e+02	-99199.315	100325.933
## Anthozoa:II-Amphibia:I	2.280975e+03	-97010.761	101572.710
## Arachnida:II-Amphibia:I	9.708571e+02	-105134.342	107076.057
## Aves:II-Amphibia:I	1.027559e+02	-99205.377	99410.888
## Bivalvia:II-Amphibia:I	5.402000e+02	-100352.771	101433.171
## Coelacanthi:II-Amphibia:I	NA	NA	NA
## Elasmobranchii:II-Amphibia:I	1.720000e+01	-108708.275	108742.675
## Gastropoda:II-Amphibia:I	1.682475e+04	-86480.346	120129.846
## Hirudinoidea:II-Amphibia:I	2.798000e+03	-118760.777	124356.777
## Hydrozoa:II-Amphibia:I	1.502778e+02	-101821.793	102122.349
## Insecta:II-Amphibia:I	4.588444e+02	-99890.225	100807.914
## Mammalia:II-Amphibia:I	6.864562e+02	-98652.743	100025.655
## Reptilia:II-Amphibia:I	2.663823e+03	-96604.407	101932.053
## Actinopteri:III-Amphibia:I	NA	NA	NA
## Amphibia:III-Amphibia:I	1.980000e+02	-140165.985	140561.985
## Anthozoa:III-Amphibia:I	9.190909e+01	-103573.764	103757.582
## Arachnida:III-Amphibia:I	NA	NA	NA
## Aves:III-Amphibia:I	1.712658e+05	68958.857	273572.768
## Bivalvia:III-Amphibia:I	NA	NA	NA
## Coelacanthi:III-Amphibia:I	NA	NA	NA
## Elasmobranchii:III-Amphibia:I	NA	NA	NA
## Gastropoda:III-Amphibia:I	NA	NA	NA
## Hirudinoidea:III-Amphibia:I	NA	NA	NA
## Hydrozoa:III-Amphibia:I	NA	NA	NA

## Insecta:III-Amphibia:I	NA	NA	NA
## Mammalia:III-Amphibia:I	1.725580e+03	-98441.533	101892.693
## Reptilia:III-Amphibia:I	1.294100e+04	-88202.016	114084.016
## Arachnida:I-Anthozoa:I	NA	NA	NA
## Aves:I-Anthozoa:I	NA	NA	NA
## Bivalvia:I-Anthozoa:I	NA	NA	NA
## Coelacanthi:I-Anthozoa:I	NA	NA	NA
## Elasmobranchii:I-Anthozoa:I	NA	NA	NA
## Gastropoda:I-Anthozoa:I	NA	NA	NA
## Hirudinoidea:I-Anthozoa:I	NA	NA	NA
## Hydrozoa:I-Anthozoa:I	NA	NA	NA
## Insecta:I-Anthozoa:I	NA	NA	NA
## Mammalia:I-Anthozoa:I	NA	NA	NA
## Reptilia:I-Anthozoa:I	NA	NA	NA
## Actinopteri:II-Anthozoa:I	NA	NA	NA
## Amphibia:II-Anthozoa:I	NA	NA	NA
## Anthozoa:II-Anthozoa:I	NA	NA	NA
## Arachnida:II-Anthozoa:I	NA	NA	NA
## Aves:II-Anthozoa:I	NA	NA	NA
## Bivalvia:II-Anthozoa:I	NA	NA	NA
## Coelacanthi:II-Anthozoa:I	NA	NA	NA
## Elasmobranchii:II-Anthozoa:I	NA	NA	NA
## Gastropoda:II-Anthozoa:I	NA	NA	NA
## Hirudinoidea:II-Anthozoa:I	NA	NA	NA
## Hydrozoa:II-Anthozoa:I	NA	NA	NA
## Insecta:II-Anthozoa:I	NA	NA	NA
## Mammalia:II-Anthozoa:I	NA	NA	NA
## Reptilia:II-Anthozoa:I	NA	NA	NA
## Actinopteri:III-Anthozoa:I	NA	NA	NA
## Amphibia:III-Anthozoa:I	NA	NA	NA
## Anthozoa:III-Anthozoa:I	NA	NA	NA
## Arachnida:III-Anthozoa:I	NA	NA	NA
## Aves:III-Anthozoa:I	NA	NA	NA
## Bivalvia:III-Anthozoa:I	NA	NA	NA
## Coelacanthi:III-Anthozoa:I	NA	NA	NA
## Elasmobranchii:III-Anthozoa:I	NA	NA	NA
## Gastropoda:III-Anthozoa:I	NA	NA	NA
## Hirudinoidea:III-Anthozoa:I	NA	NA	NA
## Hydrozoa:III-Anthozoa:I	NA	NA	NA
## Insecta:III-Anthozoa:I	NA	NA	NA
## Mammalia:III-Anthozoa:I	NA	NA	NA
## Reptilia:III-Anthozoa:I	NA	NA	NA
## Aves:I-Arachnida:I	NA	NA	NA
## Bivalvia:I-Arachnida:I	NA	NA	NA
## Coelacanthi:I-Arachnida:I	NA	NA	NA

## Elasmobranchii:I-Arachnida:I	NA	NA	NA
## Gastropoda:I-Arachnida:I	NA	NA	NA
## Hirudinoidea:I-Arachnida:I	NA	NA	NA
## Hydrozoa:I-Arachnida:I	NA	NA	NA
## Insecta:I-Arachnida:I	NA	NA	NA
## Mammalia:I-Arachnida:I	NA	NA	NA
## Reptilia:I-Arachnida:I	NA	NA	NA
## Actinopteri:II-Arachnida:I	NA	NA	NA
## Amphibia:II-Arachnida:I	NA	NA	NA
## Anthozoa:II-Arachnida:I	NA	NA	NA
## Arachnida:II-Arachnida:I	NA	NA	NA
## Aves:II-Arachnida:I	NA	NA	NA
## Bivalvia:II-Arachnida:I	NA	NA	NA
## Coelacanthi:II-Arachnida:I	NA	NA	NA
## Elasmobranchii:II-Arachnida:I	NA	NA	NA
## Gastropoda:II-Arachnida:I	NA	NA	NA
## Hirudinoidea:II-Arachnida:I	NA	NA	NA
## Hydrozoa:II-Arachnida:I	NA	NA	NA
## Insecta:II-Arachnida:I	NA	NA	NA
## Mammalia:II-Arachnida:I	NA	NA	NA
## Reptilia:II-Arachnida:I	NA	NA	NA
## Actinopteri:III-Arachnida:I	NA	NA	NA
## Amphibia:III-Arachnida:I	NA	NA	NA
## Anthozoa:III-Arachnida:I	NA	NA	NA
## Arachnida:III-Arachnida:I	NA	NA	NA
## Aves:III-Arachnida:I	NA	NA	NA
## Bivalvia:III-Arachnida:I	NA	NA	NA
## Coelacanthi:III-Arachnida:I	NA	NA	NA
## Elasmobranchii:III-Arachnida:I	NA	NA	NA
## Gastropoda:III-Arachnida:I	NA	NA	NA
## Hirudinoidea:III-Arachnida:I	NA	NA	NA
## Hydrozoa:III-Arachnida:I	NA	NA	NA
## Insecta:III-Arachnida:I	NA	NA	NA
## Mammalia:III-Arachnida:I	NA	NA	NA
## Reptilia:III-Arachnida:I	NA	NA	NA
## Bivalvia:I-Aves:I	NA	NA	NA
## Coelacanthi:I-Aves:I	-5.523246e+01	-99524.979	99414.514
## Elasmobranchii:I-Aves:I	NA	NA	NA
## Gastropoda:I-Aves:I	NA	NA	NA
## Hirudinoidea:I-Aves:I	NA	NA	NA
## Hydrozoa:I-Aves:I	NA	NA	NA
## Insecta:I-Aves:I	NA	NA	NA
## Mammalia:I-Aves:I	-1.069281e+01	-9316.757	9295.371
## Reptilia:I-Aves:I	9.792528e+02	-10405.770	12364.275
## Actinopteri:II-Aves:I	1.616887e+04	-3107.380	35445.115

## Amphibia:II-Aves:I	5.080768e+02	-11523.681	12539.835
## Anthozoa:II-Aves:I	2.225742e+03	-4917.837	9369.322
## Arachnida:II-Aves:I	9.156247e+02	-37169.745	39000.995
## Aves:II-Aves:I	4.752345e+01	-7320.466	7415.513
## Bivalvia:II-Aves:I	4.849675e+02	-18791.280	19761.215
## Coelacanthi:II-Aves:I	NA	NA	NA
## Elasmobranchii:II-Aves:I	-3.803246e+01	-44909.082	44833.017
## Gastropoda:II-Aves:I	1.676952e+04	-12626.484	46165.519
## Hirudinoidea:II-Aves:I	2.742768e+03	-67746.369	73231.904
## Hydrozoa:II-Aves:I	9.504532e+01	-24204.859	24394.950
## Insecta:II-Aves:I	4.036120e+02	-15786.443	16593.667
## Mammalia:II-Aves:I	6.312238e+02	-7144.281	8406.729
## Reptilia:II-Aves:I	2.608590e+03	-4200.494	9417.674
## Actinopteri:III-Aves:I	NA	NA	NA
## Amphibia:III-Aves:I	1.427675e+02	-99326.979	99612.514
## Anthozoa:III-Aves:I	3.667663e+01	-30602.414	30675.768
## Arachnida:III-Aves:I	NA	NA	NA
## Aves:III-Aves:I	1.712106e+05	145541.625	196879.535
## Bivalvia:III-Aves:I	NA	NA	NA
## Coelacanthi:III-Aves:I	NA	NA	NA
## Elasmobranchii:III-Aves:I	NA	NA	NA
## Gastropoda:III-Aves:I	NA	NA	NA
## Hirudinoidea:III-Aves:I	NA	NA	NA
## Hydrozoa:III-Aves:I	NA	NA	NA
## Insecta:III-Aves:I	NA	NA	NA
## Mammalia:III-Aves:I	1.670348e+03	-13350.725	16691.420
## Reptilia:III-Aves:I	1.288577e+04	-7659.105	33430.640
## Coelacanthi:I-Bivalvia:I	NA	NA	NA
## Elasmobranchii:I-Bivalvia:I	NA	NA	NA
## Gastropoda:I-Bivalvia:I	NA	NA	NA
## Hirudinoidea:I-Bivalvia:I	NA	NA	NA
## Hydrozoa:I-Bivalvia:I	NA	NA	NA
## Insecta:I-Bivalvia:I	NA	NA	NA
## Mammalia:I-Bivalvia:I	NA	NA	NA
## Reptilia:I-Bivalvia:I	NA	NA	NA
## Actinopteri:II-Bivalvia:I	NA	NA	NA
## Amphibia:II-Bivalvia:I	NA	NA	NA
## Anthozoa:II-Bivalvia:I	NA	NA	NA
## Arachnida:II-Bivalvia:I	NA	NA	NA
## Aves:II-Bivalvia:I	NA	NA	NA
## Bivalvia:II-Bivalvia:I	NA	NA	NA
## Coelacanthi:II-Bivalvia:I	NA	NA	NA
## Elasmobranchii:II-Bivalvia:I	NA	NA	NA
## Gastropoda:II-Bivalvia:I	NA	NA	NA
## Hirudinoidea:II-Bivalvia:I	NA	NA	NA

## Hydrozoa:II-Bivalvia:I	NA	NA	NA
## Insecta:II-Bivalvia:I	NA	NA	NA
## Mammalia:II-Bivalvia:I	NA	NA	NA
## Reptilia:II-Bivalvia:I	NA	NA	NA
## Actinopteri:III-Bivalvia:I	NA	NA	NA
## Amphibia:III-Bivalvia:I	NA	NA	NA
## Anthozoa:III-Bivalvia:I	NA	NA	NA
## Arachnida:III-Bivalvia:I	NA	NA	NA
## Aves:III-Bivalvia:I	NA	NA	NA
## Bivalvia:III-Bivalvia:I	NA	NA	NA
## Coelacanthi:III-Bivalvia:I	NA	NA	NA
## Elasmobranchii:III-Bivalvia:I	NA	NA	NA
## Gastropoda:III-Bivalvia:I	NA	NA	NA
## Hirudinoidea:III-Bivalvia:I	NA	NA	NA
## Hydrozoa:III-Bivalvia:I	NA	NA	NA
## Insecta:III-Bivalvia:I	NA	NA	NA
## Mammalia:III-Bivalvia:I	NA	NA	NA
## Reptilia:III-Bivalvia:I	NA	NA	NA
## Elasmobranchii:I-Coelacanthi:I	NA	NA	NA
## Gastropoda:I-Coelacanthi:I	NA	NA	NA
## Hirudinoidea:I-Coelacanthi:I	NA	NA	NA
## Hydrozoa:I-Coelacanthi:I	NA	NA	NA
## Insecta:I-Coelacanthi:I	NA	NA	NA
## Mammalia:I-Coelacanthi:I	4.453965e+01	-99426.163	99515.243
## Reptilia:I-Coelacanthi:I	1.034485e+03	-98652.207	100721.178
## Actinopteri:II-Coelacanthi:I	1.622410e+04	-84668.871	117117.071
## Amphibia:II-Coelacanthi:I	5.633093e+02	-99199.315	100325.933
## Anthozoa:II-Coelacanthi:I	2.280975e+03	-97010.761	101572.710
## Arachnida:II-Coelacanthi:I	9.708571e+02	-105134.342	107076.057
## Aves:II-Coelacanthi:I	1.027559e+02	-99205.377	99410.888
## Bivalvia:II-Coelacanthi:I	5.402000e+02	-100352.771	101433.171
## Coelacanthi:II-Coelacanthi:I	NA	NA	NA
## Elasmobranchii:II-Coelacanthi:I	1.720000e+01	-108708.275	108742.675
## Gastropoda:II-Coelacanthi:I	1.682475e+04	-86480.346	120129.846
## Hirudinoidea:II-Coelacanthi:I	2.798000e+03	-118760.777	124356.777
## Hydrozoa:II-Coelacanthi:I	1.502778e+02	-101821.793	102122.349
## Insecta:II-Coelacanthi:I	4.588444e+02	-99890.225	100807.914
## Mammalia:II-Coelacanthi:I	6.864562e+02	-98652.743	100025.655
## Reptilia:II-Coelacanthi:I	2.663823e+03	-96604.407	101932.053
## Actinopteri:III-Coelacanthi:I	NA	NA	NA
## Amphibia:III-Coelacanthi:I	1.980000e+02	-140165.985	140561.985
## Anthozoa:III-Coelacanthi:I	9.190909e+01	-103573.764	103757.582
## Arachnida:III-Coelacanthi:I	NA	NA	NA
## Aves:III-Coelacanthi:I	1.712658e+05	68958.857	273572.768
## Bivalvia:III-Coelacanthi:I	NA	NA	NA

## Coelacanthi:III-Coelacanthi:I	NA	NA	NA
## Elasmobranchii:III-Coelacanthi:I	NA	NA	NA
## Gastropoda:III-Coelacanthi:I	NA	NA	NA
## Hirudinoidea:III-Coelacanthi:I	NA	NA	NA
## Hydrozoa:III-Coelacanthi:I	NA	NA	NA
## Insecta:III-Coelacanthi:I	NA	NA	NA
## Mammalia:III-Coelacanthi:I	1.725580e+03	-98441.533	101892.693
## Reptilia:III-Coelacanthi:I	1.294100e+04	-88202.016	114084.016
## Gastropoda:I-Elasmobranchii:I	NA	NA	NA
## Hirudinoidea:I-Elasmobranchii:I	NA	NA	NA
## Hydrozoa:I-Elasmobranchii:I	NA	NA	NA
## Insecta:I-Elasmobranchii:I	NA	NA	NA
## Mammalia:I-Elasmobranchii:I	NA	NA	NA
## Reptilia:I-Elasmobranchii:I	NA	NA	NA
## Actinopteri:II-Elasmobranchii:I	NA	NA	NA
## Amphibia:II-Elasmobranchii:I	NA	NA	NA
## Anthozoa:II-Elasmobranchii:I	NA	NA	NA
## Arachnida:II-Elasmobranchii:I	NA	NA	NA
## Aves:II-Elasmobranchii:I	NA	NA	NA
## Bivalvia:II-Elasmobranchii:I	NA	NA	NA
## Coelacanthi:II-Elasmobranchii:I	NA	NA	NA
## Elasmobranchii:II-Elasmobranchii:I	NA	NA	NA
## Gastropoda:II-Elasmobranchii:I	NA	NA	NA
## Hirudinoidea:II-Elasmobranchii:I	NA	NA	NA
## Hydrozoa:II-Elasmobranchii:I	NA	NA	NA
## Insecta:II-Elasmobranchii:I	NA	NA	NA
## Mammalia:II-Elasmobranchii:I	NA	NA	NA
## Reptilia:II-Elasmobranchii:I	NA	NA	NA
## Actinopteri:III-Elasmobranchii:I	NA	NA	NA
## Amphibia:III-Elasmobranchii:I	NA	NA	NA
## Anthozoa:III-Elasmobranchii:I	NA	NA	NA
## Arachnida:III-Elasmobranchii:I	NA	NA	NA
## Aves:III-Elasmobranchii:I	NA	NA	NA
## Bivalvia:III-Elasmobranchii:I	NA	NA	NA
## Coelacanthi:III-Elasmobranchii:I	NA	NA	NA
## Elasmobranchii:III-Elasmobranchii:I	NA	NA	NA
## Gastropoda:III-Elasmobranchii:I	NA	NA	NA
## Hirudinoidea:III-Elasmobranchii:I	NA	NA	NA
## Hydrozoa:III-Elasmobranchii:I	NA	NA	NA
## Insecta:III-Elasmobranchii:I	NA	NA	NA
## Mammalia:III-Elasmobranchii:I	NA	NA	NA
## Reptilia:III-Elasmobranchii:I	NA	NA	NA
## Hirudinoidea:I-Gastropoda:I	NA	NA	NA
## Hydrozoa:I-Gastropoda:I	NA	NA	NA
## Insecta:I-Gastropoda:I	NA	NA	NA

## Mammalia:I-Gastropoda:I	NA	NA	NA
## Reptilia:I-Gastropoda:I	NA	NA	NA
## Actinopteri:II-Gastropoda:I	NA	NA	NA
## Amphibia:II-Gastropoda:I	NA	NA	NA
## Anthozoa:II-Gastropoda:I	NA	NA	NA
## Arachnida:II-Gastropoda:I	NA	NA	NA
## Aves:II-Gastropoda:I	NA	NA	NA
## Bivalvia:II-Gastropoda:I	NA	NA	NA
## Coelacanthi:II-Gastropoda:I	NA	NA	NA
## Elasmobranchii:II-Gastropoda:I	NA	NA	NA
## Gastropoda:II-Gastropoda:I	NA	NA	NA
## Hirudinoidea:II-Gastropoda:I	NA	NA	NA
## Hydrozoa:II-Gastropoda:I	NA	NA	NA
## Insecta:II-Gastropoda:I	NA	NA	NA
## Mammalia:II-Gastropoda:I	NA	NA	NA
## Reptilia:II-Gastropoda:I	NA	NA	NA
## Actinopteri:III-Gastropoda:I	NA	NA	NA
## Amphibia:III-Gastropoda:I	NA	NA	NA
## Anthozoa:III-Gastropoda:I	NA	NA	NA
## Arachnida:III-Gastropoda:I	NA	NA	NA
## Aves:III-Gastropoda:I	NA	NA	NA
## Bivalvia:III-Gastropoda:I	NA	NA	NA
## Coelacanthi:III-Gastropoda:I	NA	NA	NA
## Elasmobranchii:III-Gastropoda:I	NA	NA	NA
## Gastropoda:III-Gastropoda:I	NA	NA	NA
## Hirudinoidea:III-Gastropoda:I	NA	NA	NA
## Hydrozoa:III-Gastropoda:I	NA	NA	NA
## Insecta:III-Gastropoda:I	NA	NA	NA
## Mammalia:III-Gastropoda:I	NA	NA	NA
## Reptilia:III-Gastropoda:I	NA	NA	NA
## Hydrozoa:I-Hirudinoidea:I	NA	NA	NA
## Insecta:I-Hirudinoidea:I	NA	NA	NA
## Mammalia:I-Hirudinoidea:I	NA	NA	NA
## Reptilia:I-Hirudinoidea:I	NA	NA	NA
## Actinopteri:II-Hirudinoidea:I	NA	NA	NA
## Amphibia:II-Hirudinoidea:I	NA	NA	NA
## Anthozoa:II-Hirudinoidea:I	NA	NA	NA
## Arachnida:II-Hirudinoidea:I	NA	NA	NA
## Aves:II-Hirudinoidea:I	NA	NA	NA
## Bivalvia:II-Hirudinoidea:I	NA	NA	NA
## Coelacanthi:II-Hirudinoidea:I	NA	NA	NA
## Elasmobranchii:II-Hirudinoidea:I	NA	NA	NA
## Gastropoda:II-Hirudinoidea:I	NA	NA	NA
## Hirudinoidea:II-Hirudinoidea:I	NA	NA	NA
## Hydrozoa:II-Hirudinoidea:I	NA	NA	NA

## Insecta:II-Hirudinoidea:I	NA	NA	NA
## Mammalia:II-Hirudinoidea:I	NA	NA	NA
## Reptilia:II-Hirudinoidea:I	NA	NA	NA
## Actinopteri:III-Hirudinoidea:I	NA	NA	NA
## Amphibia:III-Hirudinoidea:I	NA	NA	NA
## Anthozoa:III-Hirudinoidea:I	NA	NA	NA
## Arachnida:III-Hirudinoidea:I	NA	NA	NA
## Aves:III-Hirudinoidea:I	NA	NA	NA
## Bivalvia:III-Hirudinoidea:I	NA	NA	NA
## Coelacanthi:III-Hirudinoidea:I	NA	NA	NA
## Elasmobranchii:III-Hirudinoidea:I	NA	NA	NA
## Gastropoda:III-Hirudinoidea:I	NA	NA	NA
## Hirudinoidea:III-Hirudinoidea:I	NA	NA	NA
## Hydrozoa:III-Hirudinoidea:I	NA	NA	NA
## Insecta:III-Hirudinoidea:I	NA	NA	NA
## Mammalia:III-Hirudinoidea:I	NA	NA	NA
## Reptilia:III-Hirudinoidea:I	NA	NA	NA
## Insecta:I-Hydrozoa:I	NA	NA	NA
## Mammalia:I-Hydrozoa:I	NA	NA	NA
## Reptilia:I-Hydrozoa:I	NA	NA	NA
## Actinopteri:II-Hydrozoa:I	NA	NA	NA
## Amphibia:II-Hydrozoa:I	NA	NA	NA
## Anthozoa:II-Hydrozoa:I	NA	NA	NA
## Arachnida:II-Hydrozoa:I	NA	NA	NA
## Aves:II-Hydrozoa:I	NA	NA	NA
## Bivalvia:II-Hydrozoa:I	NA	NA	NA
## Coelacanthi:II-Hydrozoa:I	NA	NA	NA
## Elasmobranchii:II-Hydrozoa:I	NA	NA	NA
## Gastropoda:II-Hydrozoa:I	NA	NA	NA
## Hirudinoidea:II-Hydrozoa:I	NA	NA	NA
## Hydrozoa:II-Hydrozoa:I	NA	NA	NA
## Insecta:II-Hydrozoa:I	NA	NA	NA
## Mammalia:II-Hydrozoa:I	NA	NA	NA
## Reptilia:II-Hydrozoa:I	NA	NA	NA
## Actinopteri:III-Hydrozoa:I	NA	NA	NA
## Amphibia:III-Hydrozoa:I	NA	NA	NA
## Anthozoa:III-Hydrozoa:I	NA	NA	NA
## Arachnida:III-Hydrozoa:I	NA	NA	NA
## Aves:III-Hydrozoa:I	NA	NA	NA
## Bivalvia:III-Hydrozoa:I	NA	NA	NA
## Coelacanthi:III-Hydrozoa:I	NA	NA	NA
## Elasmobranchii:III-Hydrozoa:I	NA	NA	NA
## Gastropoda:III-Hydrozoa:I	NA	NA	NA
## Hirudinoidea:III-Hydrozoa:I	NA	NA	NA
## Hydrozoa:III-Hydrozoa:I	NA	NA	NA

## Insecta:III-Hydrozoa:I	NA	NA	NA
## Mammalia:III-Hydrozoa:I	NA	NA	NA
## Reptilia:III-Hydrozoa:I	NA	NA	NA
## Mammalia:I-Insecta:I	NA	NA	NA
## Reptilia:I-Insecta:I	NA	NA	NA
## Actinopteri:II-Insecta:I	NA	NA	NA
## Amphibia:II-Insecta:I	NA	NA	NA
## Anthozoa:II-Insecta:I	NA	NA	NA
## Arachnida:II-Insecta:I	NA	NA	NA
## Aves:II-Insecta:I	NA	NA	NA
## Bivalvia:II-Insecta:I	NA	NA	NA
## Coelacanthi:II-Insecta:I	NA	NA	NA
## Elasmobranchii:II-Insecta:I	NA	NA	NA
## Gastropoda:II-Insecta:I	NA	NA	NA
## Hirudinoidea:II-Insecta:I	NA	NA	NA
## Hydrozoa:II-Insecta:I	NA	NA	NA
## Insecta:II-Insecta:I	NA	NA	NA
## Mammalia:II-Insecta:I	NA	NA	NA
## Reptilia:II-Insecta:I	NA	NA	NA
## Actinopteri:III-Insecta:I	NA	NA	NA
## Amphibia:III-Insecta:I	NA	NA	NA
## Anthozoa:III-Insecta:I	NA	NA	NA
## Arachnida:III-Insecta:I	NA	NA	NA
## Aves:III-Insecta:I	NA	NA	NA
## Bivalvia:III-Insecta:I	NA	NA	NA
## Coelacanthi:III-Insecta:I	NA	NA	NA
## Elasmobranchii:III-Insecta:I	NA	NA	NA
## Gastropoda:III-Insecta:I	NA	NA	NA
## Hirudinoidea:III-Insecta:I	NA	NA	NA
## Hydrozoa:III-Insecta:I	NA	NA	NA
## Insecta:III-Insecta:I	NA	NA	NA
## Mammalia:III-Insecta:I	NA	NA	NA
## Reptilia:III-Insecta:I	NA	NA	NA
## Reptilia:I-Mammalia:I	9.899456e+02	-10403.433	12383.324
## Actinopteri:II-Mammalia:I	1.617956e+04	-3101.624	35460.744
## Amphibia:II-Mammalia:I	5.187696e+02	-11520.895	12558.435
## Anthozoa:II-Mammalia:I	2.236435e+03	-4920.454	9393.324
## Arachnida:II-Mammalia:I	9.263175e+02	-37161.551	39014.186
## Aves:II-Mammalia:I	5.821626e+01	-7322.678	7439.110
## Bivalvia:II-Mammalia:I	4.956604e+02	-18785.524	19776.844
## Coelacanthi:II-Mammalia:I	NA	NA	NA
## Elasmobranchii:II-Mammalia:I	-2.733965e+01	-44900.510	44845.831
## Gastropoda:II-Mammalia:I	1.678021e+04	-12619.029	46179.450
## Hirudinoidea:II-Mammalia:I	2.753460e+03	-67737.026	73243.947
## Hydrozoa:II-Mammalia:I	1.057381e+02	-24198.083	24409.559

## Insecta:II-Mammalia:I	4.143048e+02	-15781.628	16610.237
## Mammalia:II-Mammalia:I	6.419166e+02	-7145.818	8429.651
## Reptilia:II-Mammalia:I	2.619283e+03	-4203.763	9442.330
## Actinopteri:III-Mammalia:I	NA	NA	NA
## Amphibia:III-Mammalia:I	1.534604e+02	-99317.243	99624.163
## Anthozoa:III-Mammalia:I	4.736944e+01	-30594.828	30689.566
## Arachnida:III-Mammalia:I	NA	NA	NA
## Aves:III-Mammalia:I	1.712213e+05	145548.610	196893.935
## Bivalvia:III-Mammalia:I	NA	NA	NA
## Coelacanthi:III-Mammalia:I	NA	NA	NA
## Elasmobranchii:III-Mammalia:I	NA	NA	NA
## Gastropoda:III-Mammalia:I	NA	NA	NA
## Hirudinoidea:III-Mammalia:I	NA	NA	NA
## Hydrozoa:III-Mammalia:I	NA	NA	NA
## Insecta:III-Mammalia:I	NA	NA	NA
## Mammalia:III-Mammalia:I	1.681041e+03	-13346.366	16708.447
## Reptilia:III-Mammalia:I	1.289646e+04	-7653.044	33445.965
## Actinopteri:II-Reptilia:I	1.518961e+04	-5176.533	35555.762
## Amphibia:II-Reptilia:I	-4.711760e+02	-14181.371	13239.019
## Anthozoa:II-Reptilia:I	1.246489e+03	-8461.084	10954.062
## Arachnida:II-Reptilia:I	-6.362812e+01	-38712.065	38584.809
## Aves:II-Reptilia:I	-9.317294e+02	-10805.610	8942.151
## Bivalvia:II-Reptilia:I	-4.942853e+02	-20860.433	19871.862
## Coelacanthi:II-Reptilia:I	NA	NA	NA
## Elasmobranchii:II-Reptilia:I	-1.017285e+03	-46367.228	44332.658
## Gastropoda:II-Reptilia:I	1.579026e+04	-14331.674	45912.203
## Hirudinoidea:II-Reptilia:I	1.763515e+03	-69031.433	72558.462
## Hydrozoa:II-Reptilia:I	-8.842075e+02	-26057.440	24289.025
## Insecta:II-Reptilia:I	-5.756408e+02	-18049.168	16897.886
## Mammalia:II-Reptilia:I	-3.480291e+02	-10529.617	9833.558
## Reptilia:II-Reptilia:I	1.629338e+03	-7834.799	11093.474
## Actinopteri:III-Reptilia:I	NA	NA	NA
## Amphibia:III-Reptilia:I	-8.364853e+02	-100523.178	98850.207
## Anthozoa:III-Reptilia:I	-9.425762e+02	-32278.819	30393.667
## Arachnida:III-Reptilia:I	NA	NA	NA
## Aves:III-Reptilia:I	1.702313e+05	143734.129	196728.525
## Bivalvia:III-Reptilia:I	NA	NA	NA
## Coelacanthi:III-Reptilia:I	NA	NA	NA
## Elasmobranchii:III-Reptilia:I	NA	NA	NA
## Gastropoda:III-Reptilia:I	NA	NA	NA
## Hirudinoidea:III-Reptilia:I	NA	NA	NA
## Hydrozoa:III-Reptilia:I	NA	NA	NA
## Insecta:III-Reptilia:I	NA	NA	NA
## Mammalia:III-Reptilia:I	6.910949e+02	-15705.212	17087.401
## Reptilia:III-Reptilia:I	1.190651e+04	-9664.253	33477.283

## Amphibia:II-Actinopteri:II	-1.566079e+04	-36395.410	5073.828
## Anthozoa:II-Actinopteri:II	-1.394313e+04	-32278.663	4392.413
## Arachnida:II-Actinopteri:II	-1.525324e+04	-56914.456	26407.970
## Aves:II-Actinopteri:II	-1.612134e+04	-34545.472	2302.784
## Bivalvia:II-Actinopteri:II	-1.568390e+04	-41310.740	9942.940
## Coelacanthi:II-Actinopteri:II	NA	NA	NA
## Elasmobranchii:II-Actinopteri:II	-1.620690e+04	-64150.328	31736.528
## Gastropoda:II-Actinopteri:II	6.006500e+02	-33300.473	34501.773
## Hirudinoidea:II-Actinopteri:II	-1.342610e+04	-85909.750	59057.550
## Hydrozoa:II-Actinopteri:II	-1.607382e+04	-45665.149	13517.504
## Insecta:II-Actinopteri:II	-1.576526e+04	-39159.253	7628.742
## Mammalia:II-Actinopteri:II	-1.553764e+04	-34128.494	3053.206
## Reptilia:II-Actinopteri:II	-1.356028e+04	-31768.101	4647.547
## Actinopteri:III-Actinopteri:II	NA	NA	NA
## Amphibia:III-Actinopteri:II	-1.602610e+04	-116919.071	84866.871
## Anthozoa:III-Actinopteri:II	-1.613219e+04	-51116.689	18852.307
## Arachnida:III-Actinopteri:II	NA	NA	NA
## Aves:III-Actinopteri:II	1.550417e+05	124316.210	185767.215
## Bivalvia:III-Actinopteri:II	NA	NA	NA
## Coelacanthi:III-Actinopteri:II	NA	NA	NA
## Elasmobranchii:III-Actinopteri:II	NA	NA	NA
## Gastropoda:III-Actinopteri:II	NA	NA	NA
## Hirudinoidea:III-Actinopteri:II	NA	NA	NA
## Hydrozoa:III-Actinopteri:II	NA	NA	NA
## Insecta:III-Actinopteri:II	NA	NA	NA
## Mammalia:III-Actinopteri:II	-1.449852e+04	-37099.269	8102.229
## Reptilia:III-Actinopteri:II	-3.283100e+03	-29877.329	23311.129
## Anthozoa:II-Amphibia:II	1.717665e+03	-8740.893	12176.223
## Arachnida:II-Amphibia:II	4.075479e+02	-38436.321	39251.416
## Aves:II-Amphibia:II	-4.605534e+02	-11073.657	10152.550
## Bivalvia:II-Amphibia:II	-2.310928e+01	-20757.728	20711.510
## Coelacanthi:II-Amphibia:II	NA	NA	NA
## Elasmobranchii:II-Amphibia:II	-5.461093e+02	-46062.719	44970.501
## Gastropoda:II-Amphibia:II	1.626144e+04	-14110.843	46633.725
## Hirudinoidea:II-Amphibia:II	2.234691e+03	-68667.136	73136.517
## Hydrozoa:II-Amphibia:II	-4.130315e+02	-25885.292	25059.229
## Insecta:II-Amphibia:II	-1.044648e+02	-18006.102	17797.172
## Mammalia:II-Amphibia:II	1.231469e+02	-10776.816	11023.109
## Reptilia:II-Amphibia:II	2.100514e+03	-8132.488	12333.516
## Actinopteri:III-Amphibia:II	NA	NA	NA
## Amphibia:III-Amphibia:II	-3.653093e+02	-100127.933	99397.315
## Anthozoa:III-Amphibia:II	-4.714002e+02	-32048.363	31105.563
## Arachnida:III-Amphibia:II	NA	NA	NA
## Aves:III-Amphibia:II	1.707025e+05	143921.055	197483.951
## Bivalvia:III-Amphibia:II	NA	NA	NA

## Coelacanthi:III-Amphibia:II	NA	NA	NA
## Elasmobranchii:III-Amphibia:II	NA	NA	NA
## Gastropoda:III-Amphibia:II	NA	NA	NA
## Hirudinoidea:III-Amphibia:II	NA	NA	NA
## Hydrozoa:III-Amphibia:II	NA	NA	NA
## Insecta:III-Amphibia:II	NA	NA	NA
## Mammalia:III-Amphibia:II	1.162271e+03	-15689.534	18014.076
## Reptilia:III-Amphibia:II	1.237769e+04	-9541.308	34296.689
## Arachnida:II-Anthozoa:II	-1.310117e+03	-38928.114	36307.879
## Aves:II-Anthozoa:II	-2.178219e+03	-6526.264	2169.827
## Bivalvia:II-Anthozoa:II	-1.740775e+03	-20076.313	16594.763
## Coelacanthi:II-Anthozoa:II	NA	NA	NA
## Elasmobranchii:II-Anthozoa:II	-2.263775e+03	-46738.816	42211.267
## Gastropoda:II-Anthozoa:II	1.454378e+04	-14244.124	43331.675
## Hirudinoidea:II-Anthozoa:II	5.170254e+02	-69720.689	70754.740
## Hydrozoa:II-Anthozoa:II	-2.130697e+03	-25691.334	21429.940
## Insecta:II-Anthozoa:II	-1.822130e+03	-16879.890	13235.630
## Mammalia:II-Anthozoa:II	-1.594518e+03	-6602.184	3413.147
## Reptilia:II-Anthozoa:II	3.828483e+02	-2931.041	3696.738
## Actinopteri:III-Anthozoa:II	NA	NA	NA
## Amphibia:III-Anthozoa:II	-2.082975e+03	-101374.710	97208.761
## Anthozoa:III-Anthozoa:II	-2.189065e+03	-32245.215	27867.084
## Arachnida:III-Anthozoa:II	NA	NA	NA
## Aves:III-Anthozoa:II	1.689848e+05	144014.586	193955.090
## Bivalvia:III-Anthozoa:II	NA	NA	NA
## Coelacanthi:III-Anthozoa:II	NA	NA	NA
## Elasmobranchii:III-Anthozoa:II	NA	NA	NA
## Gastropoda:III-Anthozoa:II	NA	NA	NA
## Hirudinoidea:III-Anthozoa:II	NA	NA	NA
## Hydrozoa:III-Anthozoa:II	NA	NA	NA
## Insecta:III-Anthozoa:II	NA	NA	NA
## Mammalia:III-Anthozoa:II	-5.553944e+02	-14348.540	13237.751
## Reptilia:III-Anthozoa:II	1.066003e+04	-9004.919	30324.970
## Aves:II-Arachnida:II	-8.681012e+02	-38529.357	36793.155
## Bivalvia:II-Arachnida:II	-4.306571e+02	-42091.870	41230.556
## Coelacanthi:II-Arachnida:II	NA	NA	NA
## Elasmobranchii:II-Arachnida:II	-9.536571e+02	-59069.868	57162.554
## Gastropoda:II-Arachnida:II	1.585389e+04	-31350.004	63057.789
## Hirudinoidea:II-Arachnida:II	1.827143e+03	-77751.757	81406.042
## Hydrozoa:II-Arachnida:II	-8.205794e+02	-45031.079	43389.920
## Insecta:II-Arachnida:II	-5.120127e+02	-40838.193	39814.168
## Mammalia:II-Arachnida:II	-2.844009e+02	-38027.498	37458.696
## Reptilia:II-Arachnida:II	1.692966e+03	-35862.947	39248.878
## Actinopteri:III-Arachnida:II	NA	NA	NA
## Amphibia:III-Arachnida:II	-7.728571e+02	-106878.057	105332.342

## Anthozoa:III-Arachnida:II	-8.789481e+02	-48866.830	47108.934
## Arachnida:III-Arachnida:II	NA	NA	NA
## Aves:III-Arachnida:II	1.702950e+05	125317.426	215272.485
## Bivalvia:III-Arachnida:II	NA	NA	NA
## Coelacanthi:III-Arachnida:II	NA	NA	NA
## Elasmobranchii:III-Arachnida:II	NA	NA	NA
## Gastropoda:III-Arachnida:II	NA	NA	NA
## Hirudinoidea:III-Arachnida:II	NA	NA	NA
## Hydrozoa:III-Arachnida:II	NA	NA	NA
## Insecta:III-Arachnida:II	NA	NA	NA
## Mammalia:III-Arachnida:II	7.547230e+02	-39116.514	40625.960
## Reptilia:III-Arachnida:II	1.197014e+04	-30293.017	54233.303
## Bivalvia:II-Aves:II	4.374441e+02	-17986.684	18861.572
## Coelacanthi:II-Aves:II	NA	NA	NA
## Elasmobranchii:II-Aves:II	-8.555591e+01	-44597.193	44426.081
## Gastropoda:II-Aves:II	1.672199e+04	-12122.411	45566.399
## Hirudinoidea:II-Aves:II	2.695244e+03	-67565.649	72956.137
## Hydrozoa:II-Aves:II	4.752187e+01	-23582.123	23677.167
## Insecta:II-Aves:II	3.560885e+02	-14809.421	15521.598
## Mammalia:II-Aves:II	5.837003e+02	-4739.198	5906.599
## Reptilia:II-Aves:II	2.561067e+03	-1212.313	6334.447
## Actinopteri:III-Aves:II	NA	NA	NA
## Amphibia:III-Aves:II	9.524409e+01	-99212.888	99403.377
## Anthozoa:III-Aves:II	-1.084681e+01	-30121.122	30099.428
## Arachnida:III-Aves:II	NA	NA	NA
## Aves:III-Aves:II	1.711631e+05	146127.681	196198.432
## Bivalvia:III-Aves:II	NA	NA	NA
## Coelacanthi:III-Aves:II	NA	NA	NA
## Elasmobranchii:III-Aves:II	NA	NA	NA
## Gastropoda:III-Aves:II	NA	NA	NA
## Hirudinoidea:III-Aves:II	NA	NA	NA
## Hydrozoa:III-Aves:II	NA	NA	NA
## Insecta:III-Aves:II	NA	NA	NA
## Mammalia:III-Aves:II	1.622824e+03	-12287.869	15533.518
## Reptilia:III-Aves:II	1.283824e+04	-6909.327	32585.815
## Coelacanthi:II-Bivalvia:II	NA	NA	NA
## Elasmobranchii:II-Bivalvia:II	-5.230000e+02	-48466.428	47420.428
## Gastropoda:II-Bivalvia:II	1.628455e+04	-17616.573	50185.673
## Hirudinoidea:II-Bivalvia:II	2.257800e+03	-70225.850	74741.450
## Hydrozoa:II-Bivalvia:II	-3.899222e+02	-29981.249	29201.404
## Insecta:II-Bivalvia:II	-8.135556e+01	-23475.353	23312.642
## Mammalia:II-Bivalvia:II	1.462562e+02	-18444.594	18737.106
## Reptilia:II-Bivalvia:II	2.123623e+03	-16084.201	20331.447
## Actinopteri:III-Bivalvia:II	NA	NA	NA
## Amphibia:III-Bivalvia:II	-3.422000e+02	-101235.171	100550.771

## Anthozoa:III-Bivalvia:II	-4.482909e+02	-35432.789	34536.207
## Arachnida:III-Bivalvia:II	NA	NA	NA
## Aves:III-Bivalvia:II	1.707256e+05	140000.110	201451.115
## Bivalvia:III-Bivalvia:II	NA	NA	NA
## Coelacanthi:III-Bivalvia:II	NA	NA	NA
## Elasmobranchii:III-Bivalvia:II	NA	NA	NA
## Gastropoda:III-Bivalvia:II	NA	NA	NA
## Hirudinoidea:III-Bivalvia:II	NA	NA	NA
## Hydrozoa:III-Bivalvia:II	NA	NA	NA
## Insecta:III-Bivalvia:II	NA	NA	NA
## Mammalia:III-Bivalvia:II	1.185380e+03	-21415.369	23786.129
## Reptilia:III-Bivalvia:II	1.240080e+04	-14193.429	38995.029
## Elasmobranchii:II-Coelacanthi:II	NA	NA	NA
## Gastropoda:II-Coelacanthi:II	NA	NA	NA
## Hirudinoidea:II-Coelacanthi:II	NA	NA	NA
## Hydrozoa:II-Coelacanthi:II	NA	NA	NA
## Insecta:II-Coelacanthi:II	NA	NA	NA
## Mammalia:II-Coelacanthi:II	NA	NA	NA
## Reptilia:II-Coelacanthi:II	NA	NA	NA
## Actinopteri:III-Coelacanthi:II	NA	NA	NA
## Amphibia:III-Coelacanthi:II	NA	NA	NA
## Anthozoa:III-Coelacanthi:II	NA	NA	NA
## Arachnida:III-Coelacanthi:II	NA	NA	NA
## Aves:III-Coelacanthi:II	NA	NA	NA
## Bivalvia:III-Coelacanthi:II	NA	NA	NA
## Coelacanthi:III-Coelacanthi:II	NA	NA	NA
## Elasmobranchii:III-Coelacanthi:II	NA	NA	NA
## Gastropoda:III-Coelacanthi:II	NA	NA	NA
## Hirudinoidea:III-Coelacanthi:II	NA	NA	NA
## Hydrozoa:III-Coelacanthi:II	NA	NA	NA
## Insecta:III-Coelacanthi:II	NA	NA	NA
## Mammalia:III-Coelacanthi:II	NA	NA	NA
## Reptilia:III-Coelacanthi:II	NA	NA	NA
## Gastropoda:II-Elasmobranchii:II	1.680755e+04	-36023.535	69638.635
## Hirudinoidea:II-Elasmobranchii:II	2.780800e+03	-80259.654	85821.254
## Hydrozoa:II-Elasmobranchii:II	1.330778e+02	-50041.457	50307.613
## Insecta:II-Elasmobranchii:II	4.416444e+02	-46346.351	47229.640
## Mammalia:II-Elasmobranchii:II	6.692562e+02	-43911.649	45250.161
## Reptilia:II-Elasmobranchii:II	2.646623e+03	-41775.919	47069.165
## Actinopteri:III-Elasmobranchii:II	NA	NA	NA
## Amphibia:III-Elasmobranchii:II	1.808000e+02	-108544.675	108906.275
## Anthozoa:III-Elasmobranchii:II	7.470909e+01	-53458.014	53607.433
## Arachnida:III-Elasmobranchii:II	NA	NA	NA
## Aves:III-Elasmobranchii:II	1.712486e+05	120396.928	222100.297
## Bivalvia:III-Elasmobranchii:II	NA	NA	NA

## Coelacanthi:III-Elasmobranchii:II	NA	NA	NA
## Elasmobranchii:III-Elasmobranchii:II	NA	NA	NA
## Gastropoda:III-Elasmobranchii:II	NA	NA	NA
## Hirudinoidea:III-Elasmobranchii:II	NA	NA	NA
## Hydrozoa:III-Elasmobranchii:II	NA	NA	NA
## Insecta:III-Elasmobranchii:II	NA	NA	NA
## Mammalia:III-Elasmobranchii:II	1.708380e+03	-44688.077	48104.837
## Reptilia:III-Elasmobranchii:II	1.292380e+04	-35543.616	61391.216
## Hirudinoidea:II-Gastropoda:II	-1.402675e+04	-89831.966	61778.466
## Hydrozoa:II-Gastropoda:II	-1.667447e+04	-53663.630	20314.686
## Insecta:II-Gastropoda:II	-1.636591e+04	-48612.306	15880.495
## Mammalia:II-Gastropoda:II	-1.613829e+04	-45089.475	12812.888
## Reptilia:II-Gastropoda:II	-1.416093e+04	-42867.652	14545.798
## Actinopteri:III-Gastropoda:II	NA	NA	NA
## Amphibia:III-Gastropoda:II	-1.662675e+04	-119931.846	86678.346
## Anthozoa:III-Gastropoda:II	-1.673284e+04	-58163.100	24697.418
## Arachnida:III-Gastropoda:II	NA	NA	NA
## Aves:III-Gastropoda:II	1.544411e+05	116538.455	192343.670
## Bivalvia:III-Gastropoda:II	NA	NA	NA
## Coelacanthi:III-Gastropoda:II	NA	NA	NA
## Elasmobranchii:III-Gastropoda:II	NA	NA	NA
## Gastropoda:III-Gastropoda:II	NA	NA	NA
## Hirudinoidea:III-Gastropoda:II	NA	NA	NA
## Hydrozoa:III-Gastropoda:II	NA	NA	NA
## Insecta:III-Gastropoda:II	NA	NA	NA
## Mammalia:III-Gastropoda:II	-1.509917e+04	-46774.792	16576.453
## Reptilia:III-Gastropoda:II	-3.883750e+03	-38521.940	30754.440
## Hydrozoa:II-Hirudinoidea:II	-2.647722e+03	-76626.038	71330.594
## Insecta:II-Hirudinoidea:II	-2.339156e+03	-74063.794	69385.483
## Mammalia:II-Hirudinoidea:II	-2.111544e+03	-72416.340	68193.252
## Reptilia:II-Hirudinoidea:II	-1.341771e+02	-70338.660	70070.306
## Actinopteri:III-Hirudinoidea:II	NA	NA	NA
## Amphibia:III-Hirudinoidea:II	-2.600000e+03	-124158.777	118958.777
## Anthozoa:III-Hirudinoidea:II	-2.706091e+03	-79001.961	73589.779
## Arachnida:III-Hirudinoidea:II	NA	NA	NA
## Aves:III-Hirudinoidea:II	1.684678e+05	94028.568	242907.057
## Bivalvia:III-Hirudinoidea:II	NA	NA	NA
## Coelacanthi:III-Hirudinoidea:II	NA	NA	NA
## Elasmobranchii:III-Hirudinoidea:II	NA	NA	NA
## Gastropoda:III-Hirudinoidea:II	NA	NA	NA
## Hirudinoidea:III-Hirudinoidea:II	NA	NA	NA
## Hydrozoa:III-Hirudinoidea:II	NA	NA	NA
## Insecta:III-Hirudinoidea:II	NA	NA	NA
## Mammalia:III-Hirudinoidea:II	-1.072420e+03	-72542.263	70397.423
## Reptilia:III-Hirudinoidea:II	1.014300e+04	-62688.296	82974.296

## Insecta:II-Hydrozoa:II	3.085667e+02	-27371.585	27988.718
## Mammalia:II-Hydrozoa:II	5.361784e+02	-23223.690	24296.047
## Reptilia:II-Hydrozoa:II	2.513545e+03	-20947.838	25974.928
## Actinopteri:III-Hydrozoa:II	NA	NA	NA
## Amphibia:III-Hydrozoa:II	4.772222e+01	-101924.349	102019.793
## Anthozoa:III-Hydrozoa:II	-5.836869e+01	-38042.928	37926.191
## Arachnida:III-Hydrozoa:II	NA	NA	NA
## Aves:III-Hydrozoa:II	1.711155e+05	137013.216	205217.853
## Bivalvia:III-Hydrozoa:II	NA	NA	NA
## Coelacanthi:III-Hydrozoa:II	NA	NA	NA
## Elasmobranchii:III-Hydrozoa:II	NA	NA	NA
## Gastropoda:III-Hydrozoa:II	NA	NA	NA
## Hirudinoidea:III-Hydrozoa:II	NA	NA	NA
## Hydrozoa:III-Hydrozoa:II	NA	NA	NA
## Insecta:III-Hydrozoa:II	NA	NA	NA
## Mammalia:III-Hydrozoa:II	1.575302e+03	-25437.759	28588.364
## Reptilia:III-Hydrozoa:II	1.279072e+04	-17642.231	43223.676
## Mammalia:II-Insecta:II	2.276118e+02	-15140.013	15595.236
## Reptilia:II-Insecta:II	2.204978e+03	-12697.002	17106.959
## Actinopteri:III-Insecta:II	NA	NA	NA
## Amphibia:III-Insecta:II	-2.608444e+02	-100609.914	100088.225
## Anthozoa:III-Insecta:II	-3.669354e+02	-33750.454	33016.583
## Arachnida:III-Insecta:II	NA	NA	NA
## Aves:III-Insecta:II	1.708070e+05	141917.512	199696.424
## Bivalvia:III-Insecta:II	NA	NA	NA
## Coelacanthi:III-Insecta:II	NA	NA	NA
## Elasmobranchii:III-Insecta:II	NA	NA	NA
## Gastropoda:III-Insecta:II	NA	NA	NA
## Hirudinoidea:III-Insecta:II	NA	NA	NA
## Hydrozoa:III-Insecta:II	NA	NA	NA
## Insecta:III-Insecta:II	NA	NA	NA
## Mammalia:III-Insecta:II	1.266736e+03	-18766.687	21300.158
## Reptilia:III-Insecta:II	1.248216e+04	-11967.736	36932.047
## Reptilia:II-Mammalia:II	1.977367e+03	-2540.333	6495.066
## Actinopteri:III-Mammalia:II	NA	NA	NA
## Amphibia:III-Mammalia:II	-4.884562e+02	-99827.655	98850.743
## Anthozoa:III-Mammalia:II	-5.945471e+02	-30807.125	29618.031
## Arachnida:III-Mammalia:II	NA	NA	NA
## Aves:III-Mammalia:II	1.705794e+05	145421.033	195737.680
## Bivalvia:III-Mammalia:II	NA	NA	NA
## Coelacanthi:III-Mammalia:II	NA	NA	NA
## Elasmobranchii:III-Mammalia:II	NA	NA	NA
## Gastropoda:III-Mammalia:II	NA	NA	NA
## Hirudinoidea:III-Mammalia:II	NA	NA	NA
## Hydrozoa:III-Mammalia:II	NA	NA	NA

## Insecta:III-Mammalia:II	NA	NA	NA
## Mammalia:III-Mammalia:II	1.039124e+03	-13091.644	15169.892
## Reptilia:III-Mammalia:II	1.225454e+04	-7648.666	32157.754
## Actinopteri:III-Reptilia:II	NA	NA	NA
## Amphibia:III-Reptilia:II	-2.465823e+03	-101734.053	96802.407
## Anthozoa:III-Reptilia:II	-2.571914e+03	-32550.323	27406.496
## Arachnida:III-Reptilia:II	NA	NA	NA
## Aves:III-Reptilia:II	1.686020e+05	143725.366	193478.613
## Bivalvia:III-Reptilia:II	NA	NA	NA
## Coelacanthi:III-Reptilia:II	NA	NA	NA
## Elasmobranchii:III-Reptilia:II	NA	NA	NA
## Gastropoda:III-Reptilia:II	NA	NA	NA
## Hirudinoidea:III-Reptilia:II	NA	NA	NA
## Hydrozoa:III-Reptilia:II	NA	NA	NA
## Insecta:III-Reptilia:II	NA	NA	NA
## Mammalia:III-Reptilia:II	-9.382427e+02	-14561.155	12684.670
## Reptilia:III-Reptilia:II	1.027718e+04	-9268.741	29823.096
## Amphibia:III-Actinopteri:III	NA	NA	NA
## Anthozoa:III-Actinopteri:III	NA	NA	NA
## Arachnida:III-Actinopteri:III	NA	NA	NA
## Aves:III-Actinopteri:III	NA	NA	NA
## Bivalvia:III-Actinopteri:III	NA	NA	NA
## Coelacanthi:III-Actinopteri:III	NA	NA	NA
## Elasmobranchii:III-Actinopteri:III	NA	NA	NA
## Gastropoda:III-Actinopteri:III	NA	NA	NA
## Hirudinoidea:III-Actinopteri:III	NA	NA	NA
## Hydrozoa:III-Actinopteri:III	NA	NA	NA
## Insecta:III-Actinopteri:III	NA	NA	NA
## Mammalia:III-Actinopteri:III	NA	NA	NA
## Reptilia:III-Actinopteri:III	NA	NA	NA
## Anthozoa:III-Amphibia:III	-1.060909e+02	-103771.764	103559.582
## Arachnida:III-Amphibia:III	NA	NA	NA
## Aves:III-Amphibia:III	1.710678e+05	68760.857	273374.768
## Bivalvia:III-Amphibia:III	NA	NA	NA
## Coelacanthi:III-Amphibia:III	NA	NA	NA
## Elasmobranchii:III-Amphibia:III	NA	NA	NA
## Gastropoda:III-Amphibia:III	NA	NA	NA
## Hirudinoidea:III-Amphibia:III	NA	NA	NA
## Hydrozoa:III-Amphibia:III	NA	NA	NA
## Insecta:III-Amphibia:III	NA	NA	NA
## Mammalia:III-Amphibia:III	1.527580e+03	-98639.533	101694.693
## Reptilia:III-Amphibia:III	1.274300e+04	-88400.016	113886.016
## Arachnida:III-Anthozoa:III	NA	NA	NA
## Aves:III-Anthozoa:III	1.711739e+05	132299.276	210048.531
## Bivalvia:III-Anthozoa:III	NA	NA	NA

## Coelacanthi:III-Anthozoa:III	NA	NA	NA
## Elasmobranchii:III-Anthozoa:III	NA	NA	NA
## Gastropoda:III-Anthozoa:III	NA	NA	NA
## Hirudinoidea:III-Anthozoa:III	NA	NA	NA
## Hydrozoa:III-Anthozoa:III	NA	NA	NA
## Insecta:III-Anthozoa:III	NA	NA	NA
## Mammalia:III-Anthozoa:III	1.633671e+03	-31198.844	34466.186
## Reptilia:III-Anthozoa:III	1.284909e+04	-22850.114	48548.295
## Aves:III-Arachnida:III	NA	NA	NA
## Bivalvia:III-Arachnida:III	NA	NA	NA
## Coelacanthi:III-Arachnida:III	NA	NA	NA
## Elasmobranchii:III-Arachnida:III	NA	NA	NA
## Gastropoda:III-Arachnida:III	NA	NA	NA
## Hirudinoidea:III-Arachnida:III	NA	NA	NA
## Hydrozoa:III-Arachnida:III	NA	NA	NA
## Insecta:III-Arachnida:III	NA	NA	NA
## Mammalia:III-Arachnida:III	NA	NA	NA
## Reptilia:III-Arachnida:III	NA	NA	NA
## Bivalvia:III-Aves:III	NA	NA	NA
## Coelacanthi:III-Aves:III	NA	NA	NA
## Elasmobranchii:III-Aves:III	NA	NA	NA
## Gastropoda:III-Aves:III	NA	NA	NA
## Hirudinoidea:III-Aves:III	NA	NA	NA
## Hydrozoa:III-Aves:III	NA	NA	NA
## Insecta:III-Aves:III	NA	NA	NA
## Mammalia:III-Aves:III	-1.695402e+05	-197791.168	-141289.296
## Reptilia:III-Aves:III	-1.583248e+05	-189861.689	-126787.936
## Coelacanthi:III-Bivalvia:III	NA	NA	NA
## Elasmobranchii:III-Bivalvia:III	NA	NA	NA
## Gastropoda:III-Bivalvia:III	NA	NA	NA
## Hirudinoidea:III-Bivalvia:III	NA	NA	NA
## Hydrozoa:III-Bivalvia:III	NA	NA	NA
## Insecta:III-Bivalvia:III	NA	NA	NA
## Mammalia:III-Bivalvia:III	NA	NA	NA
## Reptilia:III-Bivalvia:III	NA	NA	NA
## Elasmobranchii:III-Coelacanthi:III	NA	NA	NA
## Gastropoda:III-Coelacanthi:III	NA	NA	NA
## Hirudinoidea:III-Coelacanthi:III	NA	NA	NA
## Hydrozoa:III-Coelacanthi:III	NA	NA	NA
## Insecta:III-Coelacanthi:III	NA	NA	NA
## Mammalia:III-Coelacanthi:III	NA	NA	NA
## Reptilia:III-Coelacanthi:III	NA	NA	NA
## Gastropoda:III-Elasmobranchii:III	NA	NA	NA
## Hirudinoidea:III-Elasmobranchii:III	NA	NA	NA
## Hydrozoa:III-Elasmobranchii:III	NA	NA	NA

## Insecta:III-Elasmobranchii:III	NA	NA	NA
## Mammalia:III-Elasmobranchii:III	NA	NA	NA
## Reptilia:III-Elasmobranchii:III	NA	NA	NA
## Hirudinoidea:III-Gastropoda:III	NA	NA	NA
## Hydrozoa:III-Gastropoda:III	NA	NA	NA
## Insecta:III-Gastropoda:III	NA	NA	NA
## Mammalia:III-Gastropoda:III	NA	NA	NA
## Reptilia:III-Gastropoda:III	NA	NA	NA
## Hydrozoa:III-Hirudinoidea:III	NA	NA	NA
## Insecta:III-Hirudinoidea:III	NA	NA	NA
## Mammalia:III-Hirudinoidea:III	NA	NA	NA
## Reptilia:III-Hirudinoidea:III	NA	NA	NA
## Insecta:III-Hydrozoa:III	NA	NA	NA
## Mammalia:III-Hydrozoa:III	NA	NA	NA
## Reptilia:III-Hydrozoa:III	NA	NA	NA
## Mammalia:III-Insecta:III	NA	NA	NA
## Reptilia:III-Insecta:III	NA	NA	NA
## Reptilia:III-Mammalia:III	1.121542e+04	-12476.602	34907.442
##	p adj		
## Amphibia:I-Actinopteri:I	1.0000000		
## Anthozoa:I-Actinopteri:I	NA		
## Arachnida:I-Actinopteri:I	NA		
## Aves:I-Actinopteri:I	0.9041742		
## Bivalvia:I-Actinopteri:I	NA		
## Coelacanthi:I-Actinopteri:I	1.0000000		
## Elasmobranchii:I-Actinopteri:I	NA		
## Gastropoda:I-Actinopteri:I	NA		
## Hirudinoidea:I-Actinopteri:I	NA		
## Hydrozoa:I-Actinopteri:I	NA		
## Insecta:I-Actinopteri:I	NA		
## Mammalia:I-Actinopteri:I	0.9034603		
## Reptilia:I-Actinopteri:I	0.9896350		
## Actinopteri:II-Actinopteri:I	1.0000000		
## Amphibia:II-Actinopteri:I	0.9846390		
## Anthozoa:II-Actinopteri:I	0.9902411		
## Arachnida:II-Actinopteri:I	1.0000000		
## Aves:II-Actinopteri:I	0.8355495		
## Bivalvia:II-Actinopteri:I	0.9998645		
## Coelacanthi:II-Actinopteri:I	NA		
## Elasmobranchii:II-Actinopteri:I	1.0000000		
## Gastropoda:II-Actinopteri:I	1.0000000		
## Hirudinoidea:II-Actinopteri:I	1.0000000		
## Hydrozoa:II-Actinopteri:I	0.9999935		
## Insecta:II-Actinopteri:I	0.9985207		
## Mammalia:II-Actinopteri:I	0.9187741		

## Reptilia:II-Actinopteri:I	0.9947057
## Actinopteri:III-Actinopteri:I	NA
## Amphibia:III-Actinopteri:I	1.0000000
## Anthozoa:III-Actinopteri:I	1.0000000
## Arachnida:III-Actinopteri:I	NA
## Aves:III-Actinopteri:I	0.0000000
## Bivalvia:III-Actinopteri:I	NA
## Coelacanthi:III-Actinopteri:I	NA
## Elasmobranchii:III-Actinopteri:I	NA
## Gastropoda:III-Actinopteri:I	NA
## Hirudinoidea:III-Actinopteri:I	NA
## Hydrozoa:III-Actinopteri:I	NA
## Insecta:III-Actinopteri:I	NA
## Mammalia:III-Actinopteri:I	0.9997643
## Reptilia:III-Actinopteri:I	1.0000000
## Anthozoa:I-Amphibia:I	NA
## Arachnida:I-Amphibia:I	NA
## Aves:I-Amphibia:I	1.0000000
## Bivalvia:I-Amphibia:I	NA
## Coelacanthi:I-Amphibia:I	1.0000000
## Elasmobranchii:I-Amphibia:I	NA
## Gastropoda:I-Amphibia:I	NA
## Hirudinoidea:I-Amphibia:I	NA
## Hydrozoa:I-Amphibia:I	NA
## Insecta:I-Amphibia:I	NA
## Mammalia:I-Amphibia:I	1.0000000
## Reptilia:I-Amphibia:I	1.0000000
## Actinopteri:II-Amphibia:I	1.0000000
## Amphibia:II-Amphibia:I	1.0000000
## Anthozoa:II-Amphibia:I	1.0000000
## Arachnida:II-Amphibia:I	1.0000000
## Aves:II-Amphibia:I	1.0000000
## Bivalvia:II-Amphibia:I	1.0000000
## Coelacanthi:II-Amphibia:I	NA
## Elasmobranchii:II-Amphibia:I	1.0000000
## Gastropoda:II-Amphibia:I	1.0000000
## Hirudinoidea:II-Amphibia:I	1.0000000
## Hydrozoa:II-Amphibia:I	1.0000000
## Insecta:II-Amphibia:I	1.0000000
## Mammalia:II-Amphibia:I	1.0000000
## Reptilia:II-Amphibia:I	1.0000000
## Actinopteri:III-Amphibia:I	NA
## Amphibia:III-Amphibia:I	1.0000000
## Anthozoa:III-Amphibia:I	1.0000000
## Arachnida:III-Amphibia:I	NA

## Aves:III-Amphibia:I	0.0000001
## Bivalvia:III-Amphibia:I	NA
## Coelacanthi:III-Amphibia:I	NA
## Elasmobranchii:III-Amphibia:I	NA
## Gastropoda:III-Amphibia:I	NA
## Hirudinoidea:III-Amphibia:I	NA
## Hydrozoa:III-Amphibia:I	NA
## Insecta:III-Amphibia:I	NA
## Mammalia:III-Amphibia:I	1.0000000
## Reptilia:III-Amphibia:I	1.0000000
## Arachnida:I-Anthozoa:I	NA
## Aves:I-Anthozoa:I	NA
## Bivalvia:I-Anthozoa:I	NA
## Coelacanthi:I-Anthozoa:I	NA
## Elasmobranchii:I-Anthozoa:I	NA
## Gastropoda:I-Anthozoa:I	NA
## Hirudinoidea:I-Anthozoa:I	NA
## Hydrozoa:I-Anthozoa:I	NA
## Insecta:I-Anthozoa:I	NA
## Mammalia:I-Anthozoa:I	NA
## Reptilia:I-Anthozoa:I	NA
## Actinopteri:II-Anthozoa:I	NA
## Amphibia:II-Anthozoa:I	NA
## Anthozoa:II-Anthozoa:I	NA
## Arachnida:II-Anthozoa:I	NA
## Aves:II-Anthozoa:I	NA
## Bivalvia:II-Anthozoa:I	NA
## Coelacanthi:II-Anthozoa:I	NA
## Elasmobranchii:II-Anthozoa:I	NA
## Gastropoda:II-Anthozoa:I	NA
## Hirudinoidea:II-Anthozoa:I	NA
## Hydrozoa:II-Anthozoa:I	NA
## Insecta:II-Anthozoa:I	NA
## Mammalia:II-Anthozoa:I	NA
## Reptilia:II-Anthozoa:I	NA
## Actinopteri:III-Anthozoa:I	NA
## Amphibia:III-Anthozoa:I	NA
## Anthozoa:III-Anthozoa:I	NA
## Arachnida:III-Anthozoa:I	NA
## Aves:III-Anthozoa:I	NA
## Bivalvia:III-Anthozoa:I	NA
## Coelacanthi:III-Anthozoa:I	NA
## Elasmobranchii:III-Anthozoa:I	NA
## Gastropoda:III-Anthozoa:I	NA
## Hirudinoidea:III-Anthozoa:I	NA

## Hydrozoa:III-Anthozoa:I	NA
## Insecta:III-Anthozoa:I	NA
## Mammalia:III-Anthozoa:I	NA
## Reptilia:III-Anthozoa:I	NA
## Aves:I-Arachnida:I	NA
## Bivalvia:I-Arachnida:I	NA
## Coelacanthi:I-Arachnida:I	NA
## Elasmobranchii:I-Arachnida:I	NA
## Gastropoda:I-Arachnida:I	NA
## Hirudinoidea:I-Arachnida:I	NA
## Hydrozoa:I-Arachnida:I	NA
## Insecta:I-Arachnida:I	NA
## Mammalia:I-Arachnida:I	NA
## Reptilia:I-Arachnida:I	NA
## Actinopteri:II-Arachnida:I	NA
## Amphibia:II-Arachnida:I	NA
## Anthozoa:II-Arachnida:I	NA
## Arachnida:II-Arachnida:I	NA
## Aves:II-Arachnida:I	NA
## Bivalvia:II-Arachnida:I	NA
## Coelacanthi:II-Arachnida:I	NA
## Elasmobranchii:II-Arachnida:I	NA
## Gastropoda:II-Arachnida:I	NA
## Hirudinoidea:II-Arachnida:I	NA
## Hydrozoa:II-Arachnida:I	NA
## Insecta:II-Arachnida:I	NA
## Mammalia:II-Arachnida:I	NA
## Reptilia:II-Arachnida:I	NA
## Actinopteri:III-Arachnida:I	NA
## Amphibia:III-Arachnida:I	NA
## Anthozoa:III-Arachnida:I	NA
## Arachnida:III-Arachnida:I	NA
## Aves:III-Arachnida:I	NA
## Bivalvia:III-Arachnida:I	NA
## Coelacanthi:III-Arachnida:I	NA
## Elasmobranchii:III-Arachnida:I	NA
## Gastropoda:III-Arachnida:I	NA
## Hirudinoidea:III-Arachnida:I	NA
## Hydrozoa:III-Arachnida:I	NA
## Insecta:III-Arachnida:I	NA
## Mammalia:III-Arachnida:I	NA
## Reptilia:III-Arachnida:I	NA
## Bivalvia:I-Aves:I	NA
## Coelacanthi:I-Aves:I	1.0000000
## Elasmobranchii:I-Aves:I	NA

## Gastropoda:I-Aves:I	NA
## Hirudinoidea:I-Aves:I	NA
## Hydrozoa:I-Aves:I	NA
## Insecta:I-Aves:I	NA
## Mammalia:I-Aves:I	1.0000000
## Reptilia:I-Aves:I	1.0000000
## Actinopteri:II-Aves:I	0.3147089
## Amphibia:II-Aves:I	1.0000000
## Anthozoa:II-Aves:I	1.0000000
## Arachnida:II-Aves:I	1.0000000
## Aves:II-Aves:I	1.0000000
## Bivalvia:II-Aves:I	1.0000000
## Coelacanthi:II-Aves:I	NA
## Elasmobranchii:II-Aves:I	1.0000000
## Gastropoda:II-Aves:I	0.9789763
## Hirudinoidea:II-Aves:I	1.0000000
## Hydrozoa:II-Aves:I	1.0000000
## Insecta:II-Aves:I	1.0000000
## Mammalia:II-Aves:I	1.0000000
## Reptilia:II-Aves:I	0.9999961
## Actinopteri:III-Aves:I	NA
## Amphibia:III-Aves:I	1.0000000
## Anthozoa:III-Aves:I	1.0000000
## Arachnida:III-Aves:I	NA
## Aves:III-Aves:I	0.0000000
## Bivalvia:III-Aves:I	NA
## Coelacanthi:III-Aves:I	NA
## Elasmobranchii:III-Aves:I	NA
## Gastropoda:III-Aves:I	NA
## Hirudinoidea:III-Aves:I	NA
## Hydrozoa:III-Aves:I	NA
## Insecta:III-Aves:I	NA
## Mammalia:III-Aves:I	1.0000000
## Reptilia:III-Aves:I	0.9224653
## Coelacanthi:I-Bivalvia:I	NA
## Elasmobranchii:I-Bivalvia:I	NA
## Gastropoda:I-Bivalvia:I	NA
## Hirudinoidea:I-Bivalvia:I	NA
## Hydrozoa:I-Bivalvia:I	NA
## Insecta:I-Bivalvia:I	NA
## Mammalia:I-Bivalvia:I	NA
## Reptilia:I-Bivalvia:I	NA
## Actinopteri:II-Bivalvia:I	NA
## Amphibia:II-Bivalvia:I	NA
## Anthozoa:II-Bivalvia:I	NA

## Arachnida:II-Bivalvia:I	NA
## Aves:II-Bivalvia:I	NA
## Bivalvia:II-Bivalvia:I	NA
## Coelacanthi:II-Bivalvia:I	NA
## Elasmobranchii:II-Bivalvia:I	NA
## Gastropoda:II-Bivalvia:I	NA
## Hirudinoidea:II-Bivalvia:I	NA
## Hydrozoa:II-Bivalvia:I	NA
## Insecta:II-Bivalvia:I	NA
## Mammalia:II-Bivalvia:I	NA
## Reptilia:II-Bivalvia:I	NA
## Actinopteri:III-Bivalvia:I	NA
## Amphibia:III-Bivalvia:I	NA
## Anthozoa:III-Bivalvia:I	NA
## Arachnida:III-Bivalvia:I	NA
## Aves:III-Bivalvia:I	NA
## Bivalvia:III-Bivalvia:I	NA
## Coelacanthi:III-Bivalvia:I	NA
## Elasmobranchii:III-Bivalvia:I	NA
## Gastropoda:III-Bivalvia:I	NA
## Hirudinoidea:III-Bivalvia:I	NA
## Hydrozoa:III-Bivalvia:I	NA
## Insecta:III-Bivalvia:I	NA
## Mammalia:III-Bivalvia:I	NA
## Reptilia:III-Bivalvia:I	NA
## Elasmobranchii:I-Coelacanthi:I	NA
## Gastropoda:I-Coelacanthi:I	NA
## Hirudinoidea:I-Coelacanthi:I	NA
## Hydrozoa:I-Coelacanthi:I	NA
## Insecta:I-Coelacanthi:I	NA
## Mammalia:I-Coelacanthi:I	1.0000000
## Reptilia:I-Coelacanthi:I	1.0000000
## Actinopteri:II-Coelacanthi:I	1.0000000
## Amphibia:II-Coelacanthi:I	1.0000000
## Anthozoa:II-Coelacanthi:I	1.0000000
## Arachnida:II-Coelacanthi:I	1.0000000
## Aves:II-Coelacanthi:I	1.0000000
## Bivalvia:II-Coelacanthi:I	1.0000000
## Coelacanthi:II-Coelacanthi:I	NA
## Elasmobranchii:II-Coelacanthi:I	1.0000000
## Gastropoda:II-Coelacanthi:I	1.0000000
## Hirudinoidea:II-Coelacanthi:I	1.0000000
## Hydrozoa:II-Coelacanthi:I	1.0000000
## Insecta:II-Coelacanthi:I	1.0000000
## Mammalia:II-Coelacanthi:I	1.0000000

## Reptilia:II-Coelacanthi:I	1.0000000
## Actinopteri:III-Coelacanthi:I	NA
## Amphibia:III-Coelacanthi:I	1.0000000
## Anthozoa:III-Coelacanthi:I	1.0000000
## Arachnida:III-Coelacanthi:I	NA
## Aves:III-Coelacanthi:I	0.0000001
## Bivalvia:III-Coelacanthi:I	NA
## Coelacanthi:III-Coelacanthi:I	NA
## Elasmobranchii:III-Coelacanthi:I	NA
## Gastropoda:III-Coelacanthi:I	NA
## Hirudinoidea:III-Coelacanthi:I	NA
## Hydrozoa:III-Coelacanthi:I	NA
## Insecta:III-Coelacanthi:I	NA
## Mammalia:III-Coelacanthi:I	1.0000000
## Reptilia:III-Coelacanthi:I	1.0000000
## Gastropoda:I-Elasmobranchii:I	NA
## Hirudinoidea:I-Elasmobranchii:I	NA
## Hydrozoa:I-Elasmobranchii:I	NA
## Insecta:I-Elasmobranchii:I	NA
## Mammalia:I-Elasmobranchii:I	NA
## Reptilia:I-Elasmobranchii:I	NA
## Actinopteri:II-Elasmobranchii:I	NA
## Amphibia:II-Elasmobranchii:I	NA
## Anthozoa:II-Elasmobranchii:I	NA
## Arachnida:II-Elasmobranchii:I	NA
## Aves:II-Elasmobranchii:I	NA
## Bivalvia:II-Elasmobranchii:I	NA
## Coelacanthi:II-Elasmobranchii:I	NA
## Elasmobranchii:II-Elasmobranchii:I	NA
## Gastropoda:II-Elasmobranchii:I	NA
## Hirudinoidea:II-Elasmobranchii:I	NA
## Hydrozoa:II-Elasmobranchii:I	NA
## Insecta:II-Elasmobranchii:I	NA
## Mammalia:II-Elasmobranchii:I	NA
## Reptilia:II-Elasmobranchii:I	NA
## Actinopteri:III-Elasmobranchii:I	NA
## Amphibia:III-Elasmobranchii:I	NA
## Anthozoa:III-Elasmobranchii:I	NA
## Arachnida:III-Elasmobranchii:I	NA
## Aves:III-Elasmobranchii:I	NA
## Bivalvia:III-Elasmobranchii:I	NA
## Coelacanthi:III-Elasmobranchii:I	NA
## Elasmobranchii:III-Elasmobranchii:I	NA
## Gastropoda:III-Elasmobranchii:I	NA
## Hirudinoidea:III-Elasmobranchii:I	NA

## Hydrozoa:III-Elasmobranchii:I	NA
## Insecta:III-Elasmobranchii:I	NA
## Mammalia:III-Elasmobranchii:I	NA
## Reptilia:III-Elasmobranchii:I	NA
## Hirudinoidea:I-Gastropoda:I	NA
## Hydrozoa:I-Gastropoda:I	NA
## Insecta:I-Gastropoda:I	NA
## Mammalia:I-Gastropoda:I	NA
## Reptilia:I-Gastropoda:I	NA
## Actinopteri:II-Gastropoda:I	NA
## Amphibia:II-Gastropoda:I	NA
## Anthozoa:II-Gastropoda:I	NA
## Arachnida:II-Gastropoda:I	NA
## Aves:II-Gastropoda:I	NA
## Bivalvia:II-Gastropoda:I	NA
## Coelacanthi:II-Gastropoda:I	NA
## Elasmobranchii:II-Gastropoda:I	NA
## Gastropoda:II-Gastropoda:I	NA
## Hirudinoidea:II-Gastropoda:I	NA
## Hydrozoa:II-Gastropoda:I	NA
## Insecta:II-Gastropoda:I	NA
## Mammalia:II-Gastropoda:I	NA
## Reptilia:II-Gastropoda:I	NA
## Actinopteri:III-Gastropoda:I	NA
## Amphibia:III-Gastropoda:I	NA
## Anthozoa:III-Gastropoda:I	NA
## Arachnida:III-Gastropoda:I	NA
## Aves:III-Gastropoda:I	NA
## Bivalvia:III-Gastropoda:I	NA
## Coelacanthi:III-Gastropoda:I	NA
## Elasmobranchii:III-Gastropoda:I	NA
## Gastropoda:III-Gastropoda:I	NA
## Hirudinoidea:III-Gastropoda:I	NA
## Hydrozoa:III-Gastropoda:I	NA
## Insecta:III-Gastropoda:I	NA
## Mammalia:III-Gastropoda:I	NA
## Reptilia:III-Gastropoda:I	NA
## Hydrozoa:I-Hirudinoidea:I	NA
## Insecta:I-Hirudinoidea:I	NA
## Mammalia:I-Hirudinoidea:I	NA
## Reptilia:I-Hirudinoidea:I	NA
## Actinopteri:II-Hirudinoidea:I	NA
## Amphibia:II-Hirudinoidea:I	NA
## Anthozoa:II-Hirudinoidea:I	NA
## Arachnida:II-Hirudinoidea:I	NA

## Aves:II-Hirudinoidea:I	NA
## Bivalvia:II-Hirudinoidea:I	NA
## Coelacanthi:II-Hirudinoidea:I	NA
## Elasmobranchii:II-Hirudinoidea:I	NA
## Gastropoda:II-Hirudinoidea:I	NA
## Hirudinoidea:II-Hirudinoidea:I	NA
## Hydrozoa:II-Hirudinoidea:I	NA
## Insecta:II-Hirudinoidea:I	NA
## Mammalia:II-Hirudinoidea:I	NA
## Reptilia:II-Hirudinoidea:I	NA
## Actinopteri:III-Hirudinoidea:I	NA
## Amphibia:III-Hirudinoidea:I	NA
## Anthozoa:III-Hirudinoidea:I	NA
## Arachnida:III-Hirudinoidea:I	NA
## Aves:III-Hirudinoidea:I	NA
## Bivalvia:III-Hirudinoidea:I	NA
## Coelacanthi:III-Hirudinoidea:I	NA
## Elasmobranchii:III-Hirudinoidea:I	NA
## Gastropoda:III-Hirudinoidea:I	NA
## Hirudinoidea:III-Hirudinoidea:I	NA
## Hydrozoa:III-Hirudinoidea:I	NA
## Insecta:III-Hirudinoidea:I	NA
## Mammalia:III-Hirudinoidea:I	NA
## Reptilia:III-Hirudinoidea:I	NA
## Insecta:I-Hydrozoa:I	NA
## Mammalia:I-Hydrozoa:I	NA
## Reptilia:I-Hydrozoa:I	NA
## Actinopteri:II-Hydrozoa:I	NA
## Amphibia:II-Hydrozoa:I	NA
## Anthozoa:II-Hydrozoa:I	NA
## Arachnida:II-Hydrozoa:I	NA
## Aves:II-Hydrozoa:I	NA
## Bivalvia:II-Hydrozoa:I	NA
## Coelacanthi:II-Hydrozoa:I	NA
## Elasmobranchii:II-Hydrozoa:I	NA
## Gastropoda:II-Hydrozoa:I	NA
## Hirudinoidea:II-Hydrozoa:I	NA
## Hydrozoa:II-Hydrozoa:I	NA
## Insecta:II-Hydrozoa:I	NA
## Mammalia:II-Hydrozoa:I	NA
## Reptilia:II-Hydrozoa:I	NA
## Actinopteri:III-Hydrozoa:I	NA
## Amphibia:III-Hydrozoa:I	NA
## Anthozoa:III-Hydrozoa:I	NA
## Arachnida:III-Hydrozoa:I	NA

## Aves:III-Hydrozoa:I	NA
## Bivalvia:III-Hydrozoa:I	NA
## Coelacanthi:III-Hydrozoa:I	NA
## Elasmobranchii:III-Hydrozoa:I	NA
## Gastropoda:III-Hydrozoa:I	NA
## Hirudinoidea:III-Hydrozoa:I	NA
## Hydrozoa:III-Hydrozoa:I	NA
## Insecta:III-Hydrozoa:I	NA
## Mammalia:III-Hydrozoa:I	NA
## Reptilia:III-Hydrozoa:I	NA
## Mammalia:I-Insecta:I	NA
## Reptilia:I-Insecta:I	NA
## Actinopteri:II-Insecta:I	NA
## Amphibia:II-Insecta:I	NA
## Anthozoa:II-Insecta:I	NA
## Arachnida:II-Insecta:I	NA
## Aves:II-Insecta:I	NA
## Bivalvia:II-Insecta:I	NA
## Coelacanthi:II-Insecta:I	NA
## Elasmobranchii:II-Insecta:I	NA
## Gastropoda:II-Insecta:I	NA
## Hirudinoidea:II-Insecta:I	NA
## Hydrozoa:II-Insecta:I	NA
## Insecta:II-Insecta:I	NA
## Mammalia:II-Insecta:I	NA
## Reptilia:II-Insecta:I	NA
## Actinopteri:III-Insecta:I	NA
## Amphibia:III-Insecta:I	NA
## Anthozoa:III-Insecta:I	NA
## Arachnida:III-Insecta:I	NA
## Aves:III-Insecta:I	NA
## Bivalvia:III-Insecta:I	NA
## Coelacanthi:III-Insecta:I	NA
## Elasmobranchii:III-Insecta:I	NA
## Gastropoda:III-Insecta:I	NA
## Hirudinoidea:III-Insecta:I	NA
## Hydrozoa:III-Insecta:I	NA
## Insecta:III-Insecta:I	NA
## Mammalia:III-Insecta:I	NA
## Reptilia:III-Insecta:I	NA
## Reptilia:I-Mammalia:I	1.0000000
## Actinopteri:II-Mammalia:I	0.3137621
## Amphibia:II-Mammalia:I	1.0000000
## Anthozoa:II-Mammalia:I	1.0000000
## Arachnida:II-Mammalia:I	1.0000000

## Aves:II-Mammalia:I	1.0000000
## Bivalvia:II-Mammalia:I	1.0000000
## Coelacanthi:II-Mammalia:I	NA
## Elasmobranchii:II-Mammalia:I	1.0000000
## Gastropoda:II-Mammalia:I	0.9788052
## Hirudinoidea:II-Mammalia:I	1.0000000
## Hydrozoa:II-Mammalia:I	1.0000000
## Insecta:II-Mammalia:I	1.0000000
## Mammalia:II-Mammalia:I	1.0000000
## Reptilia:II-Mammalia:I	0.9999959
## Actinopteri:III-Mammalia:I	NA
## Amphibia:III-Mammalia:I	1.0000000
## Anthozoa:III-Mammalia:I	1.0000000
## Arachnida:III-Mammalia:I	NA
## Aves:III-Mammalia:I	0.0000000
## Bivalvia:III-Mammalia:I	NA
## Coelacanthi:III-Mammalia:I	NA
## Elasmobranchii:III-Mammalia:I	NA
## Gastropoda:III-Mammalia:I	NA
## Hirudinoidea:III-Mammalia:I	NA
## Hydrozoa:III-Mammalia:I	NA
## Insecta:III-Mammalia:I	NA
## Mammalia:III-Mammalia:I	1.0000000
## Reptilia:III-Mammalia:I	0.9218948
## Actinopteri:II-Reptilia:I	0.6141366
## Amphibia:II-Reptilia:I	1.0000000
## Anthozoa:II-Reptilia:I	1.0000000
## Arachnida:II-Reptilia:I	1.0000000
## Aves:II-Reptilia:I	1.0000000
## Bivalvia:II-Reptilia:I	1.0000000
## Coelacanthi:II-Reptilia:I	NA
## Elasmobranchii:II-Reptilia:I	1.0000000
## Gastropoda:II-Reptilia:I	0.9949206
## Hirudinoidea:II-Reptilia:I	1.0000000
## Hydrozoa:II-Reptilia:I	1.0000000
## Insecta:II-Reptilia:I	1.0000000
## Mammalia:II-Reptilia:I	1.0000000
## Reptilia:II-Reptilia:I	1.0000000
## Actinopteri:III-Reptilia:I	NA
## Amphibia:III-Reptilia:I	1.0000000
## Anthozoa:III-Reptilia:I	1.0000000
## Arachnida:III-Reptilia:I	NA
## Aves:III-Reptilia:I	0.0000000
## Bivalvia:III-Reptilia:I	NA
## Coelacanthi:III-Reptilia:I	NA

## Elasmobranchii:III-Reptilia:I	NA
## Gastropoda:III-Reptilia:I	NA
## Hirudinoidea:III-Reptilia:I	NA
## Hydrozoa:III-Reptilia:I	NA
## Insecta:III-Reptilia:I	NA
## Mammalia:III-Reptilia:I	1.0000000
## Reptilia:III-Reptilia:I	0.9875666
## Amphibia:II-Actinopteri:II	0.5820930
## Anthozoa:II-Actinopteri:II	0.5646002
## Arachnida:II-Actinopteri:II	0.9999989
## Aves:II-Actinopteri:II	0.2232882
## Bivalvia:II-Actinopteri:II	0.9430210
## Coelacanthi:II-Actinopteri:II	NA
## Elasmobranchii:II-Actinopteri:II	0.9999999
## Gastropoda:II-Actinopteri:II	1.0000000
## Hirudinoidea:II-Actinopteri:II	1.0000000
## Hydrozoa:II-Actinopteri:II	0.9904966
## Insecta:II-Actinopteri:II	0.8300496
## Mammalia:II-Actinopteri:II	0.3232186
## Reptilia:II-Actinopteri:II	0.6177594
## Actinopteri:III-Actinopteri:II	NA
## Amphibia:III-Actinopteri:II	1.0000000
## Anthozoa:III-Actinopteri:II	0.9996199
## Arachnida:III-Actinopteri:II	NA
## Aves:III-Actinopteri:II	0.0000000
## Bivalvia:III-Actinopteri:II	NA
## Coelacanthi:III-Actinopteri:II	NA
## Elasmobranchii:III-Actinopteri:II	NA
## Gastropoda:III-Actinopteri:II	NA
## Hirudinoidea:III-Actinopteri:II	NA
## Hydrozoa:III-Actinopteri:II	NA
## Insecta:III-Actinopteri:II	NA
## Mammalia:III-Actinopteri:II	0.8989160
## Reptilia:III-Actinopteri:II	1.0000000
## Anthozoa:II-Amphibia:II	1.0000000
## Arachnida:II-Amphibia:II	1.0000000
## Aves:II-Amphibia:II	1.0000000
## Bivalvia:II-Amphibia:II	1.0000000
## Coelacanthi:II-Amphibia:II	NA
## Elasmobranchii:II-Amphibia:II	1.0000000
## Gastropoda:II-Amphibia:II	0.9925940
## Hirudinoidea:II-Amphibia:II	1.0000000
## Hydrozoa:II-Amphibia:II	1.0000000
## Insecta:II-Amphibia:II	1.0000000
## Mammalia:II-Amphibia:II	1.0000000

## Reptilia:II-Amphibia:II	1.0000000
## Actinopteri:III-Amphibia:II	NA
## Amphibia:III-Amphibia:II	1.0000000
## Anthozoa:III-Amphibia:II	1.0000000
## Arachnida:III-Amphibia:II	NA
## Aves:III-Amphibia:II	0.0000000
## Bivalvia:III-Amphibia:II	NA
## Coelacanthi:III-Amphibia:II	NA
## Elasmobranchii:III-Amphibia:II	NA
## Gastropoda:III-Amphibia:II	NA
## Hirudinoidea:III-Amphibia:II	NA
## Hydrozoa:III-Amphibia:II	NA
## Insecta:III-Amphibia:II	NA
## Mammalia:III-Amphibia:II	1.0000000
## Reptilia:III-Amphibia:II	0.9820500
## Arachnida:II-Anthozoa:II	1.0000000
## Aves:II-Anthozoa:II	0.9978473
## Bivalvia:II-Anthozoa:II	1.0000000
## Coelacanthi:II-Anthozoa:II	NA
## Elasmobranchii:II-Anthozoa:II	1.0000000
## Gastropoda:II-Anthozoa:II	0.9974624
## Hirudinoidea:II-Anthozoa:II	1.0000000
## Hydrozoa:II-Anthozoa:II	1.0000000
## Insecta:II-Anthozoa:II	1.0000000
## Mammalia:II-Anthozoa:II	1.0000000
## Reptilia:II-Anthozoa:II	1.0000000
## Actinopteri:III-Anthozoa:II	NA
## Amphibia:III-Anthozoa:II	1.0000000
## Anthozoa:III-Anthozoa:II	1.0000000
## Arachnida:III-Anthozoa:II	NA
## Aves:III-Anthozoa:II	0.0000000
## Bivalvia:III-Anthozoa:II	NA
## Coelacanthi:III-Anthozoa:II	NA
## Elasmobranchii:III-Anthozoa:II	NA
## Gastropoda:III-Anthozoa:II	NA
## Hirudinoidea:III-Anthozoa:II	NA
## Hydrozoa:III-Anthozoa:II	NA
## Insecta:III-Anthozoa:II	NA
## Mammalia:III-Anthozoa:II	1.0000000
## Reptilia:III-Anthozoa:II	0.9908228
## Aves:II-Arachnida:II	1.0000000
## Bivalvia:II-Arachnida:II	1.0000000
## Coelacanthi:II-Arachnida:II	NA
## Elasmobranchii:II-Arachnida:II	1.0000000
## Gastropoda:II-Arachnida:II	0.9999999

## Hirudinoidea:II-Arachnida:II	1.0000000
## Hydrozoa:II-Arachnida:II	1.0000000
## Insecta:II-Arachnida:II	1.0000000
## Mammalia:II-Arachnida:II	1.0000000
## Reptilia:II-Arachnida:II	1.0000000
## Actinopteri:III-Arachnida:II	NA
## Amphibia:III-Arachnida:II	1.0000000
## Anthozoa:III-Arachnida:II	1.0000000
## Arachnida:III-Arachnida:II	NA
## Aves:III-Arachnida:II	0.0000000
## Bivalvia:III-Arachnida:II	NA
## Coelacanthi:III-Arachnida:II	NA
## Elasmobranchii:III-Arachnida:II	NA
## Gastropoda:III-Arachnida:II	NA
## Hirudinoidea:III-Arachnida:II	NA
## Hydrozoa:III-Arachnida:II	NA
## Insecta:III-Arachnida:II	NA
## Mammalia:III-Arachnida:II	1.0000000
## Reptilia:III-Arachnida:II	1.0000000
## Bivalvia:II-Aves:II	1.0000000
## Coelacanthi:II-Aves:II	NA
## Elasmobranchii:II-Aves:II	1.0000000
## Gastropoda:II-Aves:II	0.9731850
## Hirudinoidea:II-Aves:II	1.0000000
## Hydrozoa:II-Aves:II	1.0000000
## Insecta:II-Aves:II	1.0000000
## Mammalia:II-Aves:II	1.0000000
## Reptilia:II-Aves:II	0.8180163
## Actinopteri:III-Aves:II	NA
## Amphibia:III-Aves:II	1.0000000
## Anthozoa:III-Aves:II	1.0000000
## Arachnida:III-Aves:II	NA
## Aves:III-Aves:II	0.0000000
## Bivalvia:III-Aves:II	NA
## Coelacanthi:III-Aves:II	NA
## Elasmobranchii:III-Aves:II	NA
## Gastropoda:III-Aves:II	NA
## Hirudinoidea:III-Aves:II	NA
## Hydrozoa:III-Aves:II	NA
## Insecta:III-Aves:II	NA
## Mammalia:III-Aves:II	1.0000000
## Reptilia:III-Aves:II	0.8827102
## Coelacanthi:II-Bivalvia:II	NA
## Elasmobranchii:II-Bivalvia:II	1.0000000
## Gastropoda:II-Bivalvia:II	0.9990827

## Hirudinoidea:II-Bivalvia:II	1.0000000
## Hydrozoa:II-Bivalvia:II	1.0000000
## Insecta:II-Bivalvia:II	1.0000000
## Mammalia:II-Bivalvia:II	1.0000000
## Reptilia:II-Bivalvia:II	1.0000000
## Actinopteri:III-Bivalvia:II	NA
## Amphibia:III-Bivalvia:II	1.0000000
## Anthozoa:III-Bivalvia:II	1.0000000
## Arachnida:III-Bivalvia:II	NA
## Aves:III-Bivalvia:II	0.0000000
## Bivalvia:III-Bivalvia:II	NA
## Coelacanthi:III-Bivalvia:II	NA
## Elasmobranchii:III-Bivalvia:II	NA
## Gastropoda:III-Bivalvia:II	NA
## Hirudinoidea:III-Bivalvia:II	NA
## Hydrozoa:III-Bivalvia:II	NA
## Insecta:III-Bivalvia:II	NA
## Mammalia:III-Bivalvia:II	1.0000000
## Reptilia:III-Bivalvia:II	0.9995142
## Elasmobranchii:II-Coelacanthi:II	NA
## Gastropoda:II-Coelacanthi:II	NA
## Hirudinoidea:II-Coelacanthi:II	NA
## Hydrozoa:II-Coelacanthi:II	NA
## Insecta:II-Coelacanthi:II	NA
## Mammalia:II-Coelacanthi:II	NA
## Reptilia:II-Coelacanthi:II	NA
## Actinopteri:III-Coelacanthi:II	NA
## Amphibia:III-Coelacanthi:II	NA
## Anthozoa:III-Coelacanthi:II	NA
## Arachnida:III-Coelacanthi:II	NA
## Aves:III-Coelacanthi:II	NA
## Bivalvia:III-Coelacanthi:II	NA
## Coelacanthi:III-Coelacanthi:II	NA
## Elasmobranchii:III-Coelacanthi:II	NA
## Gastropoda:III-Coelacanthi:II	NA
## Hirudinoidea:III-Coelacanthi:II	NA
## Hydrozoa:III-Coelacanthi:II	NA
## Insecta:III-Coelacanthi:II	NA
## Mammalia:III-Coelacanthi:II	NA
## Reptilia:III-Coelacanthi:II	NA
## Gastropoda:II-Elasmobranchii:II	1.0000000
## Hirudinoidea:II-Elasmobranchii:II	1.0000000
## Hydrozoa:II-Elasmobranchii:II	1.0000000
## Insecta:II-Elasmobranchii:II	1.0000000
## Mammalia:II-Elasmobranchii:II	1.0000000

## Reptilia:II-Elasmobranchii:II	1.0000000
## Actinopteri:III-Elasmobranchii:II	NA
## Amphibia:III-Elasmobranchii:II	1.0000000
## Anthozoa:III-Elasmobranchii:II	1.0000000
## Arachnida:III-Elasmobranchii:II	NA
## Aves:III-Elasmobranchii:II	0.0000000
## Bivalvia:III-Elasmobranchii:II	NA
## Coelacanthi:III-Elasmobranchii:II	NA
## Elasmobranchii:III-Elasmobranchii:II	NA
## Gastropoda:III-Elasmobranchii:II	NA
## Hirudinoidea:III-Elasmobranchii:II	NA
## Hydrozoa:III-Elasmobranchii:II	NA
## Insecta:III-Elasmobranchii:II	NA
## Mammalia:III-Elasmobranchii:II	1.0000000
## Reptilia:III-Elasmobranchii:II	1.0000000
## Hirudinoidea:II-Gastropoda:II	1.0000000
## Hydrozoa:II-Gastropoda:II	0.9997717
## Insecta:II-Gastropoda:II	0.9972275
## Mammalia:II-Gastropoda:II	0.9854004
## Reptilia:II-Gastropoda:II	0.9984161
## Actinopteri:III-Gastropoda:II	NA
## Amphibia:III-Gastropoda:II	1.0000000
## Anthozoa:III-Gastropoda:II	0.9999843
## Arachnida:III-Gastropoda:II	NA
## Aves:III-Gastropoda:II	0.0000000
## Bivalvia:III-Gastropoda:II	NA
## Coelacanthi:III-Gastropoda:II	NA
## Elasmobranchii:III-Gastropoda:II	NA
## Gastropoda:III-Gastropoda:II	NA
## Hirudinoidea:III-Gastropoda:II	NA
## Hydrozoa:III-Gastropoda:II	NA
## Insecta:III-Gastropoda:II	NA
## Mammalia:III-Gastropoda:II	0.9992196
## Reptilia:III-Gastropoda:II	1.0000000
## Hydrozoa:II-Hirudinoidea:II	1.0000000
## Insecta:II-Hirudinoidea:II	1.0000000
## Mammalia:II-Hirudinoidea:II	1.0000000
## Reptilia:II-Hirudinoidea:II	1.0000000
## Actinopteri:III-Hirudinoidea:II	NA
## Amphibia:III-Hirudinoidea:II	1.0000000
## Anthozoa:III-Hirudinoidea:II	1.0000000
## Arachnida:III-Hirudinoidea:II	NA
## Aves:III-Hirudinoidea:II	0.0000000
## Bivalvia:III-Hirudinoidea:II	NA
## Coelacanthi:III-Hirudinoidea:II	NA

## Elasmobranchii:III-Hirudinoidea:II	NA
## Gastropoda:III-Hirudinoidea:II	NA
## Hirudinoidea:III-Hirudinoidea:II	NA
## Hydrozoa:III-Hirudinoidea:II	NA
## Insecta:III-Hirudinoidea:II	NA
## Mammalia:III-Hirudinoidea:II	1.0000000
## Reptilia:III-Hirudinoidea:II	1.0000000
## Insecta:II-Hydrozoa:II	1.0000000
## Mammalia:II-Hydrozoa:II	1.0000000
## Reptilia:II-Hydrozoa:II	1.0000000
## Actinopteri:III-Hydrozoa:II	NA
## Amphibia:III-Hydrozoa:II	1.0000000
## Anthozoa:III-Hydrozoa:II	1.0000000
## Arachnida:III-Hydrozoa:II	NA
## Aves:III-Hydrozoa:II	0.0000000
## Bivalvia:III-Hydrozoa:II	NA
## Coelacanthi:III-Hydrozoa:II	NA
## Elasmobranchii:III-Hydrozoa:II	NA
## Gastropoda:III-Hydrozoa:II	NA
## Hirudinoidea:III-Hydrozoa:II	NA
## Hydrozoa:III-Hydrozoa:II	NA
## Insecta:III-Hydrozoa:II	NA
## Mammalia:III-Hydrozoa:II	1.0000000
## Reptilia:III-Hydrozoa:II	0.9999569
## Mammalia:II-Insecta:II	1.0000000
## Reptilia:II-Insecta:II	1.0000000
## Actinopteri:III-Insecta:II	NA
## Amphibia:III-Insecta:II	1.0000000
## Anthozoa:III-Insecta:II	1.0000000
## Arachnida:III-Insecta:II	NA
## Aves:III-Insecta:II	0.0000000
## Bivalvia:III-Insecta:II	NA
## Coelacanthi:III-Insecta:II	NA
## Elasmobranchii:III-Insecta:II	NA
## Gastropoda:III-Insecta:II	NA
## Hirudinoidea:III-Insecta:II	NA
## Hydrozoa:III-Insecta:II	NA
## Insecta:III-Insecta:II	NA
## Mammalia:III-Insecta:II	1.0000000
## Reptilia:III-Insecta:II	0.9968972
## Reptilia:II-Mammalia:II	0.9998850
## Actinopteri:III-Mammalia:II	NA
## Amphibia:III-Mammalia:II	1.0000000
## Anthozoa:III-Mammalia:II	1.0000000
## Arachnida:III-Mammalia:II	NA

## Aves:III-Mammalia:II	0.0000000
## Bivalvia:III-Mammalia:II	NA
## Coelacanthi:III-Mammalia:II	NA
## Elasmobranchii:III-Mammalia:II	NA
## Gastropoda:III-Mammalia:II	NA
## Hirudinoidea:III-Mammalia:II	NA
## Hydrozoa:III-Mammalia:II	NA
## Insecta:III-Mammalia:II	NA
## Mammalia:III-Mammalia:II	1.0000000
## Reptilia:III-Mammalia:II	0.9384260
## Actinopteri:III-Reptilia:II	NA
## Amphibia:III-Reptilia:II	1.0000000
## Anthozoa:III-Reptilia:II	1.0000000
## Arachnida:III-Reptilia:II	NA
## Aves:III-Reptilia:II	0.0000000
## Bivalvia:III-Reptilia:II	NA
## Coelacanthi:III-Reptilia:II	NA
## Elasmobranchii:III-Reptilia:II	NA
## Gastropoda:III-Reptilia:II	NA
## Hirudinoidea:III-Reptilia:II	NA
## Hydrozoa:III-Reptilia:II	NA
## Insecta:III-Reptilia:II	NA
## Mammalia:III-Reptilia:II	1.0000000
## Reptilia:III-Reptilia:II	0.9946345
## Amphibia:III-Actinopteri:III	NA
## Anthozoa:III-Actinopteri:III	NA
## Arachnida:III-Actinopteri:III	NA
## Aves:III-Actinopteri:III	NA
## Bivalvia:III-Actinopteri:III	NA
## Coelacanthi:III-Actinopteri:III	NA
## Elasmobranchii:III-Actinopteri:III	NA
## Gastropoda:III-Actinopteri:III	NA
## Hirudinoidea:III-Actinopteri:III	NA
## Hydrozoa:III-Actinopteri:III	NA
## Insecta:III-Actinopteri:III	NA
## Mammalia:III-Actinopteri:III	NA
## Reptilia:III-Actinopteri:III	NA
## Anthozoa:III-Amphibia:III	1.0000000
## Arachnida:III-Amphibia:III	NA
## Aves:III-Amphibia:III	0.0000001
## Bivalvia:III-Amphibia:III	NA
## Coelacanthi:III-Amphibia:III	NA
## Elasmobranchii:III-Amphibia:III	NA
## Gastropoda:III-Amphibia:III	NA
## Hirudinoidea:III-Amphibia:III	NA

## Hydrozoa:III-Amphibia:III	NA
## Insecta:III-Amphibia:III	NA
## Mammalia:III-Amphibia:III	1.0000000
## Reptilia:III-Amphibia:III	1.0000000
## Arachnida:III-Anthozoa:III	NA
## Aves:III-Anthozoa:III	0.0000000
## Bivalvia:III-Anthozoa:III	NA
## Coelacanthi:III-Anthozoa:III	NA
## Elasmobranchii:III-Anthozoa:III	NA
## Gastropoda:III-Anthozoa:III	NA
## Hirudinoidea:III-Anthozoa:III	NA
## Hydrozoa:III-Anthozoa:III	NA
## Insecta:III-Anthozoa:III	NA
## Mammalia:III-Anthozoa:III	1.0000000
## Reptilia:III-Anthozoa:III	0.9999993
## Aves:III-Arachnida:III	NA
## Bivalvia:III-Arachnida:III	NA
## Coelacanthi:III-Arachnida:III	NA
## Elasmobranchii:III-Arachnida:III	NA
## Gastropoda:III-Arachnida:III	NA
## Hirudinoidea:III-Arachnida:III	NA
## Hydrozoa:III-Arachnida:III	NA
## Insecta:III-Arachnida:III	NA
## Mammalia:III-Arachnida:III	NA
## Reptilia:III-Arachnida:III	NA
## Bivalvia:III-Aves:III	NA
## Coelacanthi:III-Aves:III	NA
## Elasmobranchii:III-Aves:III	NA
## Gastropoda:III-Aves:III	NA
## Hirudinoidea:III-Aves:III	NA
## Hydrozoa:III-Aves:III	NA
## Insecta:III-Aves:III	NA
## Mammalia:III-Aves:III	0.0000000
## Reptilia:III-Aves:III	0.0000000
## Coelacanthi:III-Bivalvia:III	NA
## Elasmobranchii:III-Bivalvia:III	NA
## Gastropoda:III-Bivalvia:III	NA
## Hirudinoidea:III-Bivalvia:III	NA
## Hydrozoa:III-Bivalvia:III	NA
## Insecta:III-Bivalvia:III	NA
## Mammalia:III-Bivalvia:III	NA
## Reptilia:III-Bivalvia:III	NA
## Elasmobranchii:III-Coelacanthi:III	NA
## Gastropoda:III-Coelacanthi:III	NA
## Hirudinoidea:III-Coelacanthi:III	NA

```
## Hydrozoa:III-Coelacanthi:III NA
## Insecta:III-Coelacanthi:III NA
## Mammalia:III-Coelacanthi:III NA
## Reptilia:III-Coelacanthi:III NA
## Gastropoda:III-Elasmobranchii:III NA
## Hirudinoidea:III-Elasmobranchii:III NA
## Hydrozoa:III-Elasmobranchii:III NA
## Insecta:III-Elasmobranchii:III NA
## Mammalia:III-Elasmobranchii:III NA
## Reptilia:III-Elasmobranchii:III NA
## Hirudinoidea:III-Gastropoda:III NA
## Hydrozoa:III-Gastropoda:III NA
## Insecta:III-Gastropoda:III NA
## Mammalia:III-Gastropoda:III NA
## Reptilia:III-Gastropoda:III NA
## Hydrozoa:III-Hirudinoidea:III NA
## Insecta:III-Hirudinoidea:III NA
## Mammalia:III-Hirudinoidea:III NA
## Reptilia:III-Hirudinoidea:III NA
## Insecta:III-Hydrozoa:III NA
## Mammalia:III-Hydrozoa:III NA
## Reptilia:III-Hydrozoa:III NA
## Mammalia:III-Insecta:III NA
## Reptilia:III-Insecta:III NA
## Reptilia:III-Mammalia:III 0.9993268
```

```
Poaching.interaction <- with(CITES2016_Processed, interaction(Class, Appendix))
```

```
Poaching.anova.2way5 <- aov(data = CITES2016_Processed, Reported_quantity ~ Poaching.int
```

```
Poaching.groups <- HSD.test(Poaching.anova.2way5, "Poaching.interaction", group = TRUE)
Poaching.groups
```

```
## $statistics
```

```
##      MSerror    Df      Mean      CV
## 643502277 6777 2382.661 1064.665
##
```

```
## $parameters
```

```
##      test          name.t ntr StudentizedRange alpha
## Tukey Poaching.interaction 24          5.14601 0.05
##
```

```
## $means
```

```
##      Reported_quantity      std    r    Min    Max    Q25
## Actinopteri.I      11289.59459 42120.15890 37    2.00 213232 26.000
## Actinopteri.II     16226.10000 51006.61516 30    2.00 248000 25.500
```

## Amphibia.I	2.00000	NA	1	2.00	2	2.000
## Amphibia.II	565.30928	2464.74733	97	2.00	23638	20.000
## Amphibia.III	200.00000	NA	1	200.00	200	200.000
## Anthozoa.II	2282.97458	17606.33468	1259	2.00	556095	72.500
## Anthozoa.III	93.90909	164.22999	11	2.00	510	3.500
## Arachnida.II	972.85714	1485.29171	7	18.00	4000	100.000
## Aves.I	57.23246	201.87176	228	2.00	1720	3.000
## Aves.II	104.75591	473.89549	889	2.00	9560	4.000
## Aves.III	171267.81250	394700.82810	16	2.00	1319666	9.500
## Bivalvia.II	542.20000	660.70461	30	4.00	3350	185.000
## Coelacanthi.I	2.00000	NA	1	2.00	2	2.000
## Elasmobranchii.II	19.20000	11.18928	5	10.00	38	12.000
## Gastropoda.II	16826.75000	57508.53481	12	2.00	199429	3.750
## Hirudinoidea.II	2800.00000	2262.74170	2	1200.00	4400	2000.000
## Hydrozoa.II	152.27778	195.48937	18	5.00	585	15.500
## Insecta.II	460.84444	1229.78026	45	4.00	7660	60.000
## Mammalia.I	46.53965	224.94514	227	1.50	2800	2.000
## Mammalia.II	688.45621	3088.00668	571	2.00	34131	4.835
## Mammalia.III	1727.58019	10084.16693	54	2.00	72902	4.000
## Reptilia.I	1036.48526	5515.29409	114	1.33	56740	5.250
## Reptilia.II	2665.82285	21416.43620	3120	1.14	874819	10.000
## Reptilia.III	12943.00000	22621.11408	26	2.00	75210	400.000
##	Q50	Q75				
## Actinopteri.I	96.00	2969.00				
## Actinopteri.II	61.50	776.00				
## Amphibia.I	2.00	2.00				
## Amphibia.II	76.00	262.00				
## Amphibia.III	200.00	200.00				
## Anthozoa.II	247.00	860.50				
## Anthozoa.III	6.00	123.50				
## Arachnida.II	251.00	1170.50				
## Aves.I	5.00	17.25				
## Aves.II	14.00	44.00				
## Aves.III	74.00	1145.00				
## Bivalvia.II	325.00	687.50				
## Coelacanthi.I	2.00	2.00				
## Elasmobranchii.II	16.00	20.00				
## Gastropoda.II	14.50	46.25				
## Hirudinoidea.II	2800.00	3600.00				
## Hydrozoa.II	55.00	242.50				
## Insecta.II	110.00	353.00				
## Mammalia.I	6.00	19.50				
## Mammalia.II	18.00	113.50				
## Mammalia.III	9.50	23.75				
## Reptilia.I	20.50	235.50				

```
## Reptilia.II          52.68  390.25
## Reptilia.III        1195.00 9940.50
##
## $comparison
## NULL
##
## $groups
##           Reported_quantity groups
## Aves.III          171267.81250      a
## Gastropoda.II      16826.75000      b
## Actinopteri.II     16226.10000      b
## Reptilia.III       12943.00000      b
## Actinopteri.I      11289.59459      b
## Hirudinoidea.II    2800.00000      b
## Reptilia.II        2665.82285      b
## Anthozoa.II        2282.97458      b
## Mammalia.III       1727.58019      b
## Reptilia.I         1036.48526      b
## Arachnida.II       972.85714      b
## Mammalia.II        688.45621      b
## Amphibia.II        565.30928      b
## Bivalvia.II        542.20000      b
## Insecta.II         460.84444      b
## Amphibia.III       200.00000      b
## Hydrozoa.II        152.27778      b
## Aves.II            104.75591      b
## Anthozoa.III       93.90909      b
## Aves.I              57.23246      b
## Mammalia.I         46.53965      b
## Elasmobranchii.II  19.20000      b
## Amphibia.I         2.00000      b
## Coelacanthi.I      2.00000      b
##
## attr(,"class")
## [1] "group"
```

```
Poaching.anova.plot <- ggplot(CITES2016_Processed, aes(y = Reported_quantity, x = Class,
  color = Appendix)) + geom_boxplot()
print(Poaching.anova.plot)
```

```
## Warning: Removed 52684 rows containing non-finite values (stat_boxplot).
```


2 Dataset Information

3 Exploratory Analysis

4 Analysis

4.1 Question 1: <insert specific question here and add additional subsections for additional questions below, if needed>

4.2 Question 2:

5 Summary and Conclusions

6 References

<add references here if relevant, otherwise delete this section>