A1_Green_20158921

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Link to GitHub Repository (https://github.com/alyssagreen02/BIOL432_Assignment1)

Load libraries

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(ggplot2)
library(gridExtra)
```

```
##
## Attaching package: 'gridExtra'
```

```
## The following object is masked from 'package:dplyr':
##
##     combine
```

```
library(tidyr)
library(grid)
source("http://bit.ly/theme_pub")
```

Load previous R scripts

Load script that generates limb measurement data

```
source("dataGenerato.R")
```

Load script that calculates limb volume data

```
source("volumeEstimato.R")
```

Load measurements.csv

```
measurements=read.csv("measurements.csv")
```

Sort data by species, then by observer, then by limb volume

```
measurements=measurements%>%arrange(Organism, Observer, Volume)
measurements
```

```
##              Organism Limb_width Limb_length Observer     Volume
## 1      Grenous benous           3           2 Alyssa G  14.137167
## 2      Grenous benous           8           1 Alyssa G  50.265482
## 3      Grenous benous           6           2 Alyssa G  56.548668
## 4      Grenous benous           5           5 Alyssa G  98.174770
## 5      Grenous benous           6           4 Alyssa G 113.097336
## 6      Grenous benous           5           7 Alyssa G 137.444679
## 7      Grenous benous           7           8 Alyssa G 307.876080
## 8      Grenous benous           4           0   Josh G   0.000000
## 9      Grenous benous           3           2   Josh G  14.137167
## 10     Grenous benous           3           3   Josh G  21.205750
## 11     Grenous benous           3           5   Josh G  35.342917
## 12     Grenous benous           4           5   Josh G  62.831853
## 13     Grenous benous           5           5   Josh G  98.174770
## 14     Grenous benous           8           3   Josh G 150.796447
## 15     Grenous benous           4           4    Sam P  50.265482
## 16     Grenous benous           6           3    Sam P  84.823002
## 17     Grenous benous           9           4    Sam P 254.469005
## 18     Grenous benous           8           6    Sam P 301.592895
## 19     Grenous benous           9          12    Sam P 763.407015
## 20       Orng samples           2           4 Alyssa G  12.566371
## 21       Orng samples           5           4 Alyssa G  78.539816
## 22       Orng samples           5           5 Alyssa G  98.174770
## 23       Orng samples           6           4 Alyssa G 113.097336
## 24       Orng samples           5           8 Alyssa G 157.079633
## 25       Orng samples           5          11 Alyssa G 215.984495
## 26       Orng samples           8           5 Alyssa G 251.327412
## 27       Orng samples           7           7 Alyssa G 269.391570
## 28       Orng samples           9           7 Alyssa G 445.320759
## 29       Orng samples           3           3   Josh G  21.205750
## 30       Orng samples           3           8   Josh G  56.548668
## 31       Orng samples           4           8   Josh G 100.530965
## 32       Orng samples           4           9   Josh G 113.097336
## 33       Orng samples           5           7   Josh G 137.444679
## 34       Orng samples           6           6   Josh G 169.646003
## 35       Orng samples           8           4   Josh G 201.061930
## 36       Orng samples           0           7    Sam P   0.000000
## 37       Orng samples           1           5    Sam P   3.926991
## 38       Orng samples           2           3    Sam P   9.424778
## 39       Orng samples           5           2    Sam P  39.269908
## 40       Orng samples           5           4    Sam P  78.539816
## 41       Orng samples           4           7    Sam P  87.964594
## 42       Orng samples           5           7    Sam P 137.444679
## 43       Orng samples           7           5    Sam P 192.422550
## 44       Orng samples           6           7    Sam P 197.920337
## 45       Orng samples           8           6    Sam P 301.592895
## 46       Orng samples           8           7    Sam P 351.858377
## 47  Pinkus grafiarous           2           5 Alyssa G  15.707963
## 48  Pinkus grafiarous           3           8 Alyssa G  56.548668
## 49  Pinkus grafiarous           8           2 Alyssa G 100.530965
## 50  Pinkus grafiarous          10           2 Alyssa G 157.079633
## 51  Pinkus grafiarous          11           2 Alyssa G 190.066356
```

```
## 52  Pinkus grafiarous          9           3 Alyssa G 190.851754
## 53  Pinkus grafiarous          1           4   Josh G   3.141593
## 54  Pinkus grafiarous          4           2   Josh G  25.132741
## 55  Pinkus grafiarous          5           6   Josh G 117.809725
## 56  Pinkus grafiarous          8           4   Josh G 201.061930
## 57  Pinkus grafiarous          8           4   Josh G 201.061930
## 58  Pinkus grafiarous          1           5    Sam P   3.926991
## 59  Pinkus grafiarous          3           9    Sam P  63.617251
## 60  Pinkus grafiarous          4           6    Sam P  75.398224
## 61  Pinkus grafiarous         11           2    Sam P 190.066356
## 62  Pinkus grafiarous          8           5    Sam P 251.327412
## 63  Pinkus grafiarous         10           4    Sam P 314.159265
## 64  Purlous elefanous          3           5 Alyssa G  35.342917
## 65  Purlous elefanous          5           8 Alyssa G 157.079633
## 66  Purlous elefanous          6           6 Alyssa G 169.646003
## 67  Purlous elefanous         12           7 Alyssa G 791.681349
## 68  Purlous elefanous          2           5   Josh G  15.707963
## 69  Purlous elefanous          2           6   Josh G  18.849556
## 70  Purlous elefanous          2           6   Josh G  18.849556
## 71  Purlous elefanous          5           1   Josh G  19.634954
## 72  Purlous elefanous          3           6   Josh G  42.411501
## 73  Purlous elefanous          4           6   Josh G  75.398224
## 74  Purlous elefanous          5           4   Josh G  78.539816
## 75  Purlous elefanous          5           4   Josh G  78.539816
## 76  Purlous elefanous          4           8   Josh G 100.530965
## 77  Purlous elefanous          7           4   Josh G 153.938040
## 78  Purlous elefanous          8           7   Josh G 351.858377
## 79  Purlous elefanous          2           0    Sam P   0.000000
## 80  Purlous elefanous          1           6    Sam P   4.712389
## 81  Purlous elefanous          6           5    Sam P 141.371669
## 82  Purlous elefanous          8           4    Sam P 201.061930
## 83  Purlous elefanous          7           6    Sam P 230.907060
## 84  Purlous elefanous         10           3    Sam P 235.619449
## 85  Purlous elefanous         11           9    Sam P 855.298600
## 86   Specious peoples          3           2 Alyssa G  14.137167
## 87   Specious peoples          4           3 Alyssa G  37.699112
## 88   Specious peoples          5           7 Alyssa G 137.444679
## 89   Specious peoples          5           8 Alyssa G 157.079633
## 90   Specious peoples          9           4 Alyssa G 254.469005
## 91   Specious peoples          5           5   Josh G  98.174770
## 92   Specious peoples          6           4   Josh G 113.097336
## 93   Specious peoples          5           7   Josh G 137.444679
## 94   Specious peoples          6           0    Sam P   0.000000
## 95   Specious peoples          4           6    Sam P  75.398224
## 96   Specious peoples          4           6    Sam P  75.398224
## 97   Specious peoples          5           6    Sam P 117.809725
## 98   Specious peoples          5           7    Sam P 137.444679
## 99   Specious peoples          7           5    Sam P 192.422550
## 100  Specious peoples          8           5    Sam P 251.327412
```

Generate table showing average volume for each species

```
AvgVol=measurements%>%group_by(Organism)%>%summarise(Average_Volume=mean(Volume))
AvgVol
```

```
## # A tibble: 5 × 2
##   Organism          Average_Volume
##   <chr>                      <dbl>
## 1 Grenous benous              138.
## 2 Orng samples                142.
## 3 Pinkus grafiarous           127.
## 4 Purlous elefanous           172.
## 5 Specious peoples            120.
```

Generate table showing number of observations for each combination of species and observer

```
Num_Obs=measurements%>%count(Organism, Observer)
Num_Obs
```

```
##             Organism Observer  n
## 1     Grenous benous Alyssa G  7
## 2     Grenous benous   Josh G  7
## 3     Grenous benous    Sam P  5
## 4       Orng samples Alyssa G  9
## 5       Orng samples   Josh G  7
## 6       Orng samples    Sam P 11
## 7  Pinkus grafiarous Alyssa G  6
## 8  Pinkus grafiarous   Josh G  5
## 9  Pinkus grafiarous    Sam P  6
## 10 Purlous elefanous Alyssa G  4
## 11 Purlous elefanous   Josh G 11
## 12 Purlous elefanous    Sam P  7
## 13  Specious peoples Alyssa G  5
## 14  Specious peoples   Josh G  3
## 15  Specious peoples    Sam P  7
```

Create boxplot to compare key features of the distributions of volumes for each species

```
ggplot(data = measurements, aes(x=Organism, y=Volume))+geom_boxplot()+theme_pub()+ labs(caption
= "Figure 1: Box plot of volume distributions for species,")+theme(plot.caption = element_text(h
just=0))
```

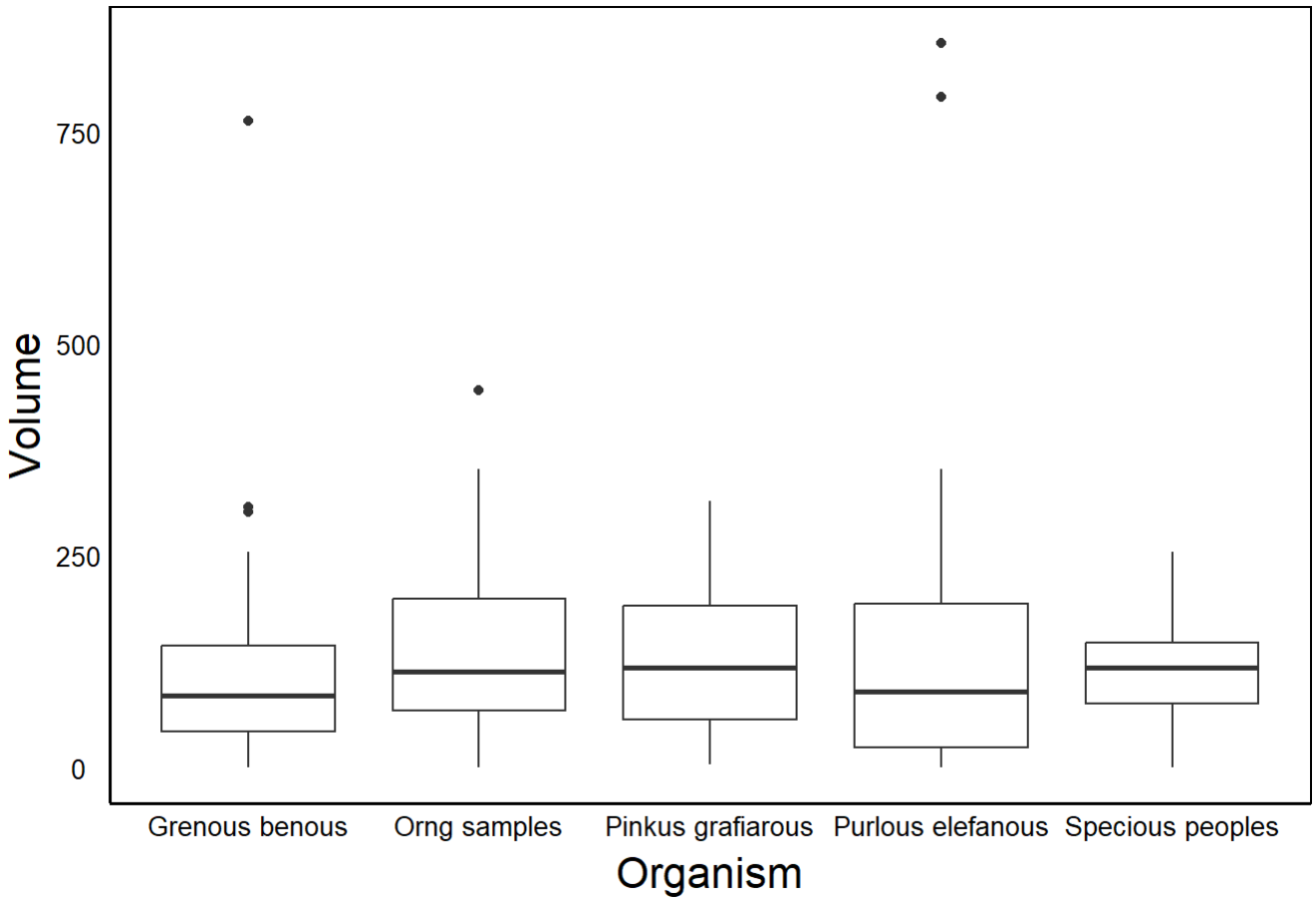

Figure 1: Box plot of volume distributions for species,

Generate multi-panel plot showing frequency histograms for each species

Create seperate data sets for each species

```
SP=measurements%>%filter(Organism=="Specious peoples")
GB=measurements%>%filter(Organism=="Grenous benous")
PE=measurements%>%filter(Organism=="Purlous elefanous")
PG=measurements%>%filter(Organism=="Pinkus grafiarous")
OS=measurements%>%filter(Organism=="Orng samples")
```

Create histograms for each species

```
SPP=ggplot(aes(Volume), data=SP)+geom_bar()+theme_pub()+ggtitle("Specious peoples")
GBP=ggplot(aes(Volume), data=GB)+geom_bar()+theme_pub()+ggtitle("Grenous benous")
PEP=ggplot(aes(Volume), data=PE)+geom_bar()+theme_pub()+ggtitle("Purlous elefanous")
PGP=ggplot(aes(Volume), data=PG)+geom_bar()+theme_pub()+ggtitle("Pinkus grafiarous")
OSP=ggplot(aes(Volume), data=OS)+geom_bar()+theme_pub()+ggtitle("Orng samples")
```

Combine histograms into multi-panel plot

```
grid.arrange(SPP, GBP, PEP, PGP, OSP ,ncol=2, bottom = textGrob("Figure 2: Frequency histograms
for each species' limb volumes.", x = 0, y = 0.5, just = "left"))
```

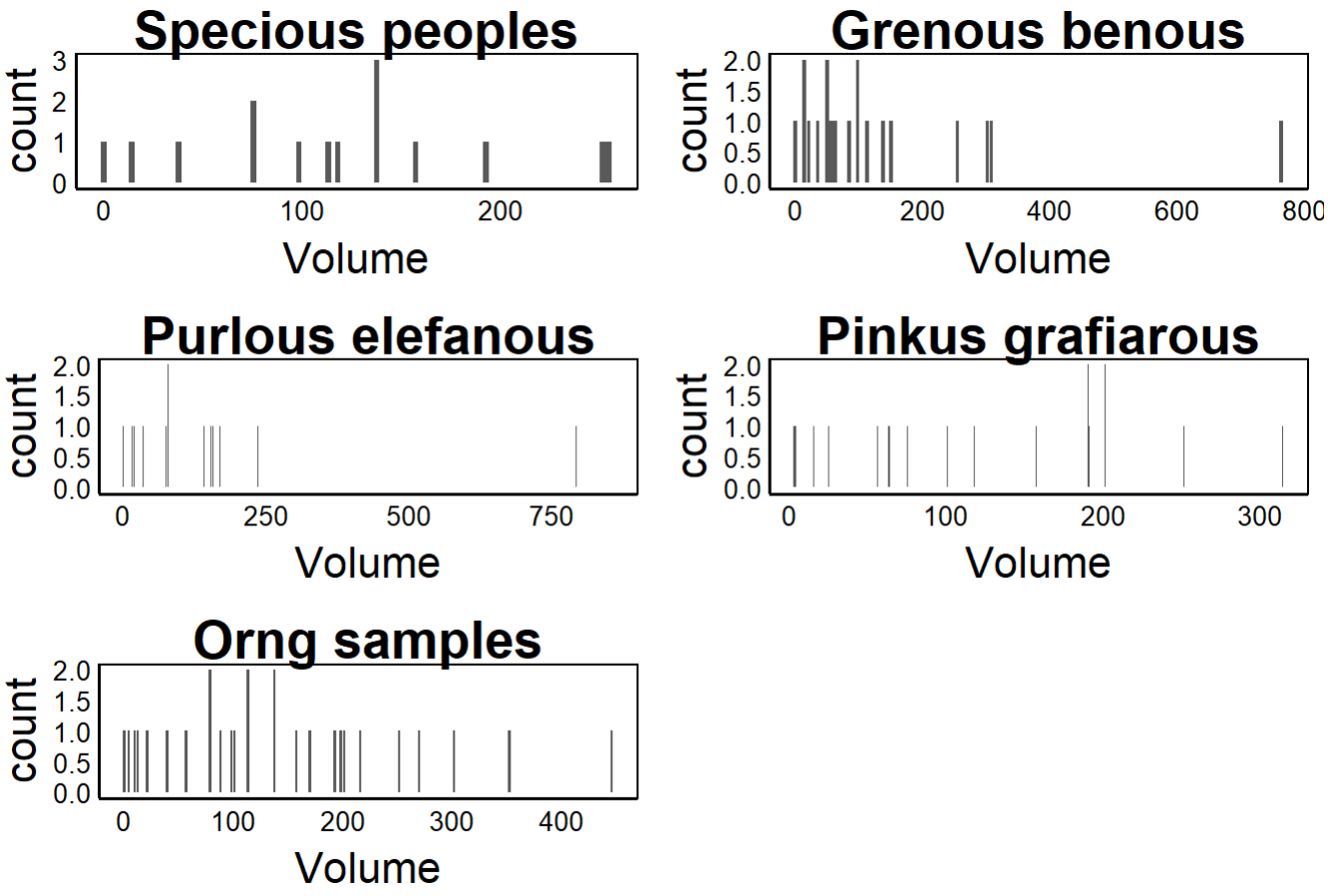

Figure 2: Frequency histograms for each species' limb volumes.