BIOL432 Assignment 1 Report

Sam Boots

January 13th 2023

GitHub repository for BIOL432 Assignment 1 (https://github.com/SBootss/BIOL432_Assignment1)

Setup

Loading libraries

Loading libraries for use in assignment:

```
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)
```

Loading default plotting theme

```
source("http://bit.ly/theme_pub")
theme_set(theme_pub())
```

Generating data and estimating limb volume R Script #1

The following script creates a data frame of 100 randomly sampled values for each of the variables organism, limbwidth, limb-length and observer. The data frame is then exported to a csv called 'measurements.csv'.

```
source('dataGenerato.R')
```

R Script #2

The following script adds a "Volume" column, estimating limb-volume from limb-width and limb-length with the assumption that the organism's limbs are cylindrical. The script overrides the original measurements.csv file with the new one including volume estimates.

source('volumeEstimato.R')

Loading data

Importing limb volume data from measurements.csv:

LimbData<-read.csv("measurements.csv")</pre>

Sorting data using dplyr

By species:

LimbData %>%
 arrange(Organism)

##		Organism	Limb_width	Limb_length	0bserver	Volume
##	1	Alois gorus	6.785557	29.52975	Lee N	1067.8754
##	2	Alois gorus	6.518064	31.98207	Lee N	1067.1701
##	3	Alois gorus	8.029719	37.64523	Lee N	1906.3405
##	4	Alois gorus	4.562951	28.22030	Mike R	461.4696
##	5	Alois gorus	4.000972	28.22570	Lee N	354.8670
##	6	Alois gorus	9.444699	30.14558	Sam B	2111.9803
##	7	Alois gorus	8.972326	32.68559	Sam B	2066.5997
##	8	Alois gorus	7.705967	33.38166	Mike R	1556.8690
##	9	Alois gorus	9.971449	32.08303	Sam B	2505.4275
##	10	Alois gorus	6.431763	31.02211	Lee N	1007.9088
##	11	Alois gorus	6.451524	32.67852	Mike R	1068.2598
##	12	Alois gorus	10.702706	29.66052	Sam B	2668.4300
##	13	Alois gorus	8.265021	27.34622	Sam B	1467.1522
##	14	Alois gorus	8.560933	23.80171	Lee N	1370.0622
##	15	Alois gorus	5.387517	40.78054	Sam B	929.6515
##	16	Alois gorus	6.934553	29.44342	Sam B	1112.0264
##	17	Alois gorus	10.518580	25.29155	Mike R	2197.7562
##	18	Alois gorus	8.560797	37.49364	Lee N	2158.1216
##	19	Alois gorus	8.121689	30.00446	Sam B	1554.4201
##	20	Alois gorus	8.067644	41.73071	Sam B	2133.2372
##	21	Alois gorus	9.530325	27.39663	Lee N	1954.3507
##	22	Alois gorus	9.747507	39.96828	Sam B	2982.5822
##	23	Alois gorus	6.124179	40.53236	Mike R	1193.9537
##	24	Alois gorus	7.586411	35.27736	Sam B	1594.6255
##	25	Babius busteria	11.282547	35.44134	Mike R	3543.3518
##	26	Babius busteria	9.527949	30.45778	Lee N	2171.6355
##	27	Babius busteria	4.270614	30.80083	Mike R	441.1974
##	28	Babius busteria	8.900486	28.94937	Mike R	1801.1772
##	29	Babius busteria	9.623791	29.41192	Lee N	2139.4667
##	30	Babius busteria	11.846130	23.72239	Mike R	2614.5756
##	31	Babius busteria	12.380730	25.46397	Sam B	3065.5506
##	32	Babius busteria	9.643333	14.93453	Mike R	1090.7767
##	33	Babius busteria	9.950043	33.95577	Mike R	2640.3007
##	34	Babius busteria	4.820332	26.42685	Mike R	482.2688
##	35	Babius busteria	7.857736	23.94082	Lee N	1160.9775
##	36	Babius busteria	8.788819	20.67589	Sam B	1254.3396
##	37	Babius busteria	6.326452	37.72568	Lee N	1185.8982
##	38	Babius busteria	6.399220	33.69635	Sam B	1083.7442
##	39	Babius busteria	9.647486	22.44429	Mike R	1640.6804
##	40	Babius busteria	9.012599	28.63319	Lee N	1826.6684
##	41	Babius busteria	7.320403	21.83338	Lee N	918.9268
##	42	Babius busteria	7.747767	33.17067	Lee N	1563.8576
##	43	Babius busteria	5.875977	29.60991	Lee N	802.9474
##	44	Babius busteria	9.493598	30.68464	Lee N	2172.0635
##	45	Felis bingus	7.913127	37.18024	Sam B	1828.5141
##	46	Felis bingus	6.342199	21.41190	Lee N	676.4332
##	47	Felis bingus	9.047865	31.30612	Mike R	2012.8496
##	48	Felis bingus	8.371895	42.22421	Sam B	2324.3363
##	49	Felis bingus	8.132326	36.51179	Sam B	1896.4988
##	50	Felis bingus	5.908381	33.12830	Sam B	908.2931
##	51	Felis bingus	6.153675	27.95617	Sam B	831.4511

## 52 Felis bingus 8.562402 25.16977 Sam B 1449.3070 ## 53 Felis bingus 9.915618 33.50866 Lee N 2587.5367 ## 55 Felis bingus 9.131987 34.55362 Lee N 1223.4205 ## 55 Felis bingus 5.940509 36.91567 Lee N 1223.1706 ## 57 Felis bingus 12.088902 23.52084 Mike R 2699.7051 ## 59 Felis bingus 10.641437 35.87268 Sam B 3190.4669 ## 60 Felis bingus 6.133290 29.51911 Mike R 872.1277 ## 61 Felis bingus 8.748947 30.30355 Lee N 1821.7761 ## 63 Felis bingus 5.153508 38.43704 Sam B 801.7626 ## 64 Felis bingus 9.544390 27.71285 Mike R 1026.5599 ## 65 Felis bingus 9.544390 27.71285 Mike R 1026.5599 ## 67 Felis lilacus 7.392085 23.91996 Mike R 1026.5599 ## 67 Felis lilacus 8.387778 26.29771 Sam B 1453.1207 ## 70 Felis lilacus 8.387778 26.29771 Sam B 1453.1207 ## 71 Felis lilacus 8.749673 35.56346 Sam B 2138.3440 ## 71 Felis lilacus 8.343178 22.45933 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 226.1350 ## 73 Felis lilacus 9.349178 22.45933 Sam B 197.1541 ## 74 Felis lilacus 9.349178 22.45933 Sam B 197.1541 ## 75 Felis lilacus 7.339150 18.16668 Mike R 779.0304 ## 77 Felis lilacus 9.349178 24.3627 Mike R 779.0304 ## 78 Felis lilacus 3.798630 20.93394 Lee N 2352.0752 ## 75 Felis lilacus 3.738150 18.16668 Mike R 779.0304 ## 78 Felis lilacus 3.738150 18.16668 Mike R 779.0304 ## 78 Felis lilacus 8.357218 30.75200 Sam B 1314.4151 ## 78 Felis lilacus 8.357218 30.75200 Sam B 1314.4151 ## 78 Felis lilacus 8.357218 30.75200 Sam B 1314.4151 ## 78 Felis lilacus 8.357218 30.17040 Lee N 252.0752 ## 75 Felis lilacus 8.357218 30.17040 Lee N 2752.8935 Polka dotdeadius 7.28238 29.80930 Mike R 828.5729 ## 80 Polka dotdeadius 7.28238 29.80930 Mike R 828.5729 ## 81 Polka dotdeadius 7.28282 29.80930 Mike R 828.5729 ## 82 Polka dotdeadius 7.28282 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.28282 29.68898 Lee N 1214.9160 ## 99 Polka dotdeadius 8.826686 37.16848 Sam B 2277.8048 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1306.6473 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1306.6473 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B						
## 54	## 5	52	Felis bingus	8.562402	25.16977	Sam B 1449.3070
## 55	## 5	53	•	9.915618	33.50866	Lee N 2587.5367
## 56	## 5	54	Felis bingus	6.628480	35.45340	Lee N 1223.4205
## 57 Felis bingus 12.088902 23.52084 Mike R 2699.7051 ## 58 Felis bingus 3.746261 32.51398 Sam B 358.3901 ## 59 Felis bingus 10.641437 35.87268 Sam B 3190.4669 ## 60 Felis bingus 6.133290 29.51911 Mike R 872.1277 ## 61 Felis bingus 8.748947 30.30355 Lee N 1821.7761 ## 62 Felis bingus 5.153508 38.43704 Sam B 801.7626 ## 64 Felis bingus 9.544390 27.71285 Mike R 1982.7475 ## 65 Felis bingus 8.058693 27.67766 Mike R 1411.7199 ## 66 Felis lilacus 7.392085 23.91996 Mike R 1026.5599 ## 67 Felis lilacus 9.218998 28.93624 Sam B 1931.5211 ## 68 Felis lilacus 9.969012 17.54851 Lee N 1369.7282 ## 70 Felis lilacus 8.387778 26.29771 Sam B 1453.1207 ## 71 Felis lilacus 3.708630 20.93394 Sam B 2138.3440 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 9.343178 22.45933 Sam B 197.1541 ## 74 Felis lilacus 9.340157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 77 Felis lilacus 3.996534 33.17290 Lee N 3725.8935 ## 80 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 78 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 80 Felis lilacus 5.940968 29.89003 Mike R 2418.7592 ## 81 Felis lilacus 5.940968 29.89003 Mike R 2418.7592 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 1653.3229 ## 83 Polka dotdeadius 5.940968 29.89003 Mike R 1653.3229 ## 84 Polka dotdeadius 5.940968 29.89003 Mike R 1653.3229 ## 85 Polka dotdeadius 7.28278 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1257.6931 ## 90 Polka dotdeadius 7.386475 27.93317 Lee N 1214.9160 ## 91 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6673 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6923 ## 91 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6923 ## 91 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6923 ## 91 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6673 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1810.6923 ## 99 Polka dotdeadius 8.355217 29.84971 Lee N 777.0764 ## 99 Polka	## 5	55	Felis bingus	9.131987	34.55362	Lee N 2263.1533
## 58	## 5	56	Felis bingus	5.940509	36.91567	Lee N 1023.1706
## 59	## 5	57	Felis bingus	12.088902	23.52084	Mike R 2699.7051
## 60	## 5	58	Felis bingus	3.746261	32.51398	Sam B 358.3901
## 61 Felis bingus 5.719330 26.21354 Mike R 673.4507 ## 62 Felis bingus 8.748947 30.30355 Lee N 1821.7761 ## 63 Felis bingus 9.544390 27.67766 Mike R 1982.7475 ## 64 Felis bingus 9.544390 27.67766 Mike R 1982.7475 ## 65 Felis bingus 9.544390 27.67766 Mike R 1982.7475 ## 66 Felis lilacus 7.392085 23.91996 Mike R 1026.5599 ## 67 Felis lilacus 9.218998 28.93624 Sam B 1931.5211 ## 68 Felis lilacus 8.387778 26.29771 Sam B 1453.1207 ## 70 Felis lilacus 8.749673 35.56346 Sam B 2138.3440 ## 71 Felis lilacus 9.447224 38.51855 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 74 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 8 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.28383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 7.857406 34.09647 Mike R 1521.9791 ## 88 Polka dotdeadius 7.628079 27.51920 Lee N 11257.6391 ## 89 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.386750 25.66800 Sam B 1691.6923 ## 90 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 91 Polka dotdeadius 8.362663 29.16084 Sam B 12274.3645 ## 92 Polka dotdeadius 8.362663 29.16084 Sam B 12274.3645 ## 93 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.362663 29.16084 Sam B 1839.5338 ## 97 Polka dotdeadius 8.362663 29.16084 Sam B 1839.5338 ## 97 Polka dotdeadius 8.352671 23.29846 Sam B 1839.5338 ## 97 Polka dotdeadius 8.352671 23.29846 Sam B 1839.5338 ## 97 Polka dotdeadius 8.352663 29.16084 Sam B 1806.6473 ## 98 Polka dotdeadius 8.352663 29.16084 Sam B 1839.5338 ## 97 Polka dotdeadius 8.352666 24.20524 Mike R 888.3547 ## 98 Polka dotdeadius 8.352663 29.16084 Sam B 1	## 5	59	Felis bingus	10.641437	35.87268	Sam B 3190.4669
## 62 Felis bingus 8.748947 30.30355 Lee N 1821.7761 ## 63 Felis bingus 5.153508 38.43704 Sam B 801.7626 ## 64 Felis bingus 9.544390 27.71285 Mike R 1982.7475 ## 65 Felis bingus 8.058693 27.67766 Mike R 1411.7199 ## 66 Felis lilacus 7.392085 23.91996 Mike R 1026.5599 ## 67 Felis lilacus 9.218998 28.93624 Sam B 1931.5211 ## 68 Felis lilacus 8.387778 26.29771 Sam B 1931.5211 ## 70 Felis lilacus 8.749673 35.56346 Sam B 2138.3440 ## 71 Felis lilacus 9.447224 38.51855 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 2828.5729 ## 88 Polka dotdeadius 5.940968 29.89003 Mike R 1653.3229 ## 88 Polka dotdeadius 5.940968 29.89003 Mike R 1653.3229 ## 88 Polka dotdeadius 5.060362 18.10477 Sam B 393.4723 ## 88 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 88 Polka dotdeadius 7.28383 22.44454 Mike R 1653.3229 ## 88 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 88 Polka dotdeadius 7.282884 26.65574 Mike R 1066.2560 ## 88 Polka dotdeadius 7.28288 26.665574 Mike R 1066.2560 ## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1296.9734 ## 99 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 91 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 1610.6923 ## 97 Polka dotdeadius 8.836663 29.16084 Sam B 1690.8347 ## 99 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.315501 33.87201 Sam B 1396.6473 ## 99 Polka dotdeadius 8.315501 33.87201 Sam B 1396.6473 ## 99 Polka dotdeadius 8.315501 33.87201 Sam B 1396.6473 ## 99 Polka dotdeadius 8.315501 33.87201 Sam B 1396.6473 ## 99 Polka dotdeadius 8.315501 33.87201 S	## 6	50	Felis bingus	6.133290	29.51911	Mike R 872.1277
## 63	## 6	51	Felis bingus	5.719330	26.21354	Mike R 673.4507
## 64 Felis bingus	## 6	52	Felis bingus	8.748947	30.30355	Lee N 1821.7761
## 65	## 6	53	Felis bingus	5.153508	38.43704	Sam B 801.7626
## 66	## 6	54	Felis bingus	9.544390	27.71285	Mike R 1982.7475
## 67 Felis lilacus 9.218998 28.93624 Sam B 1931.5211 ## 68 Felis lilacus 9.969012 17.54851 Lee N 1369.7282 ## 69 Felis lilacus 8.387778 26.29771 Sam B 1453.1207 ## 70 Felis lilacus 8.749673 35.56346 Sam B 2138.3440 ## 71 Felis lilacus 3.798630 20.93394 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 78 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 6.932884 26.65574 Mike R 1653.3229 ## 84 Polka dotdeadius 6.932884 26.65574 Mike R 1606.2560 ## 86 Polka dotdeadius 6.932884 26.65574 Mike R 1060.2560 ## 87 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.362663 29.16084 Sam B 1810.9847 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1801.9847 ## 99 Polka dotdeadius 8.362663 29.16084 Sam B 1801.6923 ## 97 Polka dotdeadius 8.35501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 6	55	Felis bingus	8.058693	27.67766	Mike R 1411.7199
## 68	## 6	56	Felis lilacus	7.392085	23.91996	Mike R 1026.5599
## 69	## 6	57	Felis lilacus	9.218998	28.93624	Sam B 1931.5211
## 70 Felis lilacus 8.749673 35.56346 Sam B 2138.3440 ## 71 Felis lilacus 3.708630 20.93394 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 3.343178 22.45933 Sam B 197.1541 ## 74 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 85 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 87 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 92 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 10.498876 20.91892 Sam B 1800.9847 ## 95 Polka dotdeadius 8.362663 29.16684 Sam B 1601.6923 ## 96 Polka dotdeadius 8.362663 29.16684 Sam B 1601.6923 ## 97 Polka dotdeadius 8.35501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 6	58	Felis lilacus	9.969012	17.54851	Lee N 1369.7282
## 71 Felis lilacus 3.708630 20.93394 Sam B 226.1350 ## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 3.343178 22.45933 Sam B 197.1541 ## 74 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 76 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9166.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.362663 29.16084 Sam B 1839.5338 ## 97 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 6	59	Felis lilacus	8.387778	26.29771	Sam B 1453.1207
## 72 Felis lilacus 9.447224 38.51855 Sam B 2700.0276 ## 73 Felis lilacus 3.343178 22.45933 Sam B 197.1541 ## 74 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 85 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 87 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.826686 24.20524 Mike R 888.3547 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.362663 29.16084 Sam B 1839.5338 ## 97 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 7	70	Felis lilacus	8.749673	35.56346	Sam B 2138.3440
## 73	## 7	71	Felis lilacus	3.708630	20.93394	Sam B 226.1350
## 74 Felis lilacus 9.310157 34.54994 Lee N 2352.0752 ## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 85 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 86 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.826663 29.16084 Sam B 1601.6923 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.35501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 7	72	Felis lilacus	9.447224	38.51855	Sam B 2700.0276
## 75 Felis lilacus 7.389150 18.16668 Mike R 779.0304 ## 76 Felis lilacus 7.377083 30.75200 Sam B 1314.4151 ## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 85 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 91 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.315501 33.87201 Sam B 1395.338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764	## 7	73	Felis lilacus	3.343178	22.45933	Sam B 197.1541
## 76 Felis lilacus	## 7	74	Felis lilacus	9.310157	34.54994	Lee N 2352.0752
## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 85 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 86 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.35866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 5.75274 29.84971 Lee N 777.0764 ## 98 Polka dotdeadius 5.75274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111	## 7	75	Felis lilacus	7.389150	18.16668	Mike R 779.0304
## 77 Felis lilacus 3.996534 33.17290 Lee N 416.1410 ## 78 Felis lilacus 11.242344 24.36627 Mike R 2418.7592 ## 79 Felis lilacus 10.605205 42.17959 Lee N 3725.8935 ## 80 Felis lilacus 8.357218 30.17040 Lee N 1654.9866 ## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 85 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 86 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.35866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
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## 81 Felis lilacus 7.728383 32.44454 Mike R 1521.9791 ## 82 Polka dotdeadius 5.940968 29.89003 Mike R 828.5729 ## 83 Polka dotdeadius 7.857406 34.09647 Mike R 1653.3229 ## 84 Polka dotdeadius 5.260362 18.10477 Sam B 393.4723 ## 85 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 86 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 8.362663 29.16084 Sam B 1810.9847 ## 94 Polka dotdeadius 8.35866 24.20524 Mike R 888.3547 ## 95 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 5.354.9111			Felis lilacus			
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## 85 Polka dotdeadius 6.932884 26.65574 Mike R 1006.2560 ## 86 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 90 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111	## 8	34				
## 86 Polka dotdeadius 10.674896 19.94432 Sam B 1784.9928 ## 87 Polka dotdeadius 7.628079 27.51920 Lee N 1257.6391 ## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
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## 88 Polka dotdeadius 7.218228 29.68898 Lee N 1214.9160 ## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 89 Polka dotdeadius 7.386475 27.93317 Lee N 1196.9734 ## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 90 Polka dotdeadius 5.719096 25.66800 Sam B 659.3814 ## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 91 Polka dotdeadius 8.826686 37.16848 Sam B 2274.3645 ## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 92 Polka dotdeadius 9.308741 31.05364 Lee N 2113.4126 ## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 93 Polka dotdeadius 10.498876 20.91892 Sam B 1810.9847 ## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 94 Polka dotdeadius 8.362663 29.16084 Sam B 1601.6923 ## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 95 Polka dotdeadius 6.835866 24.20524 Mike R 888.3547 ## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 96 Polka dotdeadius 8.315501 33.87201 Sam B 1839.5338 ## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 97 Polka dotdeadius 8.450271 23.29846 Sam B 1306.6473 ## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 98 Polka dotdeadius 5.757274 29.84971 Lee N 777.0764 ## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
## 99 Polka dotdeadius 4.917620 28.16319 Sam B 534.9111						
ππ 100 FUINA UULUEAUIUS 3.343232 34.42300 LEE N 2303.1/9/						
	##	דממ	roika uotueadius	J. 345252	J4.42300	Lee N 2303.1/9/

LimbData %>%
 arrange(Observer)

44		Onganism	limb vid+b	limb langth	Obsanian	Valuma
##	1	Alois gorus	6.785557	Limb_length 29.52975		Volume 1067.8754
##		Felis bingus	6.342199	21.41190	Lee N	676.4332
##		Alois gorus	6.518064	31.98207		1067.1701
##	_	Babius busteria	9.527949	30.45778		2171.6355
##		Alois gorus	8.029719	37.64523		1906.3405
##	_	Alois gorus	4.000972	28.22570	Lee N	354.8670
##		Felis lilacus	9.969012	17.54851		1369.7282
##		Babius busteria	9.623791	29.41192		2139.4667
##	-	Polka dotdeadius	7.628079	27.51920		1257.6391
##	10	Polka dotdeadius	7.218228	29.68898		1214.9160
##	11	Polka dotdeadius	7.386475	27.93317		1196.9734
##	12	Felis lilacus	9.310157	34.54994		2352.0752
##	13	Felis bingus	9.915618	33.50866	Lee N	2587.5367
##	14	Felis bingus	6.628480	35.45340	Lee N	1223.4205
##	15	Polka dotdeadius	9.308741	31.05364	Lee N	2113.4126
##	16	Felis bingus	9.131987	34.55362	Lee N	2263.1533
##	17	Felis bingus	5.940509	36.91567	Lee N	1023.1706
##	18	Babius busteria	7.857736	23.94082	Lee N	1160.9775
##	19	Alois gorus	6.431763	31.02211	Lee N	1007.9088
##	20	Babius busteria	6.326452	37.72568	Lee N	1185.8982
##	21	Alois gorus	8.560933	23.80171	Lee N	1370.0622
##	22	Alois gorus	8.560797	37.49364	Lee N	2158.1216
##	23	Alois gorus	9.530325	27.39663	Lee N	1954.3507
##	24	Felis lilacus	3.996534	33.17290	Lee N	416.1410
##	25	Babius busteria	9.012599	28.63319	Lee N	1826.6684
##	26	Babius busteria	7.320403	21.83338	Lee N	918.9268
	27	Felis lilacus	10.605205	42.17959		3725.8935
	28	Felis bingus	8.748947	30.30355		1821.7761
	29	Polka dotdeadius	5.757274	29.84971	Lee N	777.0764
	30	Babius busteria	7.747767	33.17067		1563.8576
	31	Babius busteria	5.875977	29.60991		802.9474
	32	Polka dotdeadius	9.349292	34.42306		2363.1797
	33	Felis lilacus				1654.9866
	34	Babius busteria				2172.0635
	35	Babius busteria Felis lilacus				3543.3518 1026.5599
	36 37	Felis bingus	7.392085 9.047865			2012.8496
	38	Alois gorus				461.4696
	39	Babius busteria		30.80083		441.1974
	40	Polka dotdeadius	5.940968	29.89003	Mike R	828.5729
	41	Polka dotdeadius	7.857406	34.09647		1653.3229
	42	Babius busteria	8.900486	28.94937		1801.1772
	43	Polka dotdeadius	6.932884			1006.2560
	44	Babius busteria				2614.5756
	45	Alois gorus	7.705967			1556.8690
	46	Babius busteria				1090.7767
##	47	Babius busteria	9.950043			2640.3007
##	48	Babius busteria	4.820332	26.42685	Mike R	482.2688
##	49	Alois gorus	6.451524	32.67852	Mike R	1068.2598
##	50	Felis bingus	12.088902	23.52084	Mike R	2699.7051
##	51	Felis lilacus	7.389150	18.16668	Mike R	779.0304
1						

##	52	Felis bingus	6.133290	29.51911	Mike R 872.1277
##	53	Alois gorus	10.518580	25.29155	Mike R 2197.7562
##	54	Felis bingus	5.719330	26.21354	Mike R 673.4507
##	55	Polka dotdeadius	6.835866	24.20524	Mike R 888.3547
##	56	Felis lilacus	11.242344	24.36627	Mike R 2418.7592
##	57	Babius busteria	9.647486	22.44429	Mike R 1640.6804
##	58	Alois gorus	6.124179	40.53236	Mike R 1193.9537
##	59	Felis lilacus	7.728383	32.44454	Mike R 1521.9791
##	60	Felis bingus	9.544390	27.71285	Mike R 1982.7475
	61	Felis bingus	8.058693	27.67766	Mike R 1411.7199
##	62	Felis bingus	7.913127	37.18024	Sam B 1828.5141
	63	Felis bingus	8.371895	42.22421	Sam B 2324.3363
	64	_	9.218998	28.93624	Sam B 1931.5211
	65	Polka dotdeadius	5.260362	18.10477	Sam B 393.4723
	66	Polka dotdeadius	10.674896	19.94432	Sam B 1784.9928
	67	Felis lilacus	8.387778	26.29771	Sam B 1453.1207
	68	Alois gorus	9.444699	30.14558	Sam B 2111.9803
	69	Felis lilacus	8.749673	35.56346	Sam B 2138.3440
	70		8.132326	36.51179	Sam B 1896.4988
	71	Felis lilacus	3.708630	20.93394	Sam B 226.1350
	71 72	Alois gorus	8.972326	32.68559	Sam B 2066.5997
	72 73	Felis lilacus			Sam B 2700.0276
		Felis lilacus Felis bingus	9.447224	38.51855	
	74 75	_	5.908381	33.12830	Sam B 908.2931
	75 76	Felis lilacus	3.343178	22.45933	Sam B 197.1541
	76	Felis bingus	6.153675	27.95617	Sam B 831.4511
	77	Polka dotdeadius	5.719096	25.66800	Sam B 659.3814
	78	Babius busteria	12.380730	25.46397	Sam B 3065.5506
	79	Felis bingus	8.562402	25.16977	Sam B 1449.3070
	80	Alois gorus	9.971449	32.08303	Sam B 2505.4275
	81	Polka dotdeadius	8.826686	37.16848	Sam B 2274.3645
##	82	Polka dotdeadius	10.498876	20.91892	Sam B 1810.9847
##	83	Babius busteria	8.788819	20.67589	Sam B 1254.3396
##	84	Alois gorus	10.702706	29.66052	Sam B 2668.4300
##	85	Alois gorus	8.265021	27.34622	Sam B 1467.1522
##	86	Felis bingus	3.746261	32.51398	Sam B 358.3901
##	87	Alois gorus	5.387517	40.78054	Sam B 929.6515
##	88	Felis bingus	10.641437	35.87268	Sam B 3190.4669
##	89	Alois gorus	6.934553	29.44342	Sam B 1112.0264
	90	Polka dotdeadius	8.362663	29.16084	Sam B 1601.6923
	91	Alois gorus	8.121689	30.00446	Sam B 1554.4201
	92	Babius busteria	6.399220	33.69635	Sam B 1083.7442
	93	Felis lilacus	7.377083	30.75200	Sam B 1314.4151
	94	Alois gorus	8.067644	41.73071	Sam B 2133.2372
	95	Polka dotdeadius	8.315501	33.87201	Sam B 1839.5338
	96	Polka dotdeadius	8.450271	23.29846	Sam B 1306.6473
	90 97	Alois gorus	9.747507	39.96828	Sam B 2982.5822
		Polka dotdeadius			
	98 aa		4.917620	28.16319 38.43704	Sam B 534.9111
	99	Felis bingus	5.153508	38.43704	Sam B 801.7626
##	100	Alois gorus	7.586411	35.27736	Sam B 1594.6255

LimbData %>%
 arrange(Volume)

##		_	Limb_width	Limb_length	Observe	r	Volume
##	1	Felis lilacus	3.343178	22.45933	Sam I	В	197.1541
##	2	Felis lilacus	3.708630	20.93394	Sam I	В	226.1350
##	3	Alois gorus	4.000972	28.22570	Lee I	N	354.8670
##	4	Felis bingus	3.746261	32.51398	Sam I	В	358.3901
##	5	Polka dotdeadius	5.260362	18.10477	Sam I	В	393.4723
##	6	Felis lilacus	3.996534	33.17290	Lee I	N	416.1410
##	7	Babius busteria	4.270614	30.80083	Mike I	R	441.1974
##	8	Alois gorus	4.562951	28.22030	Mike I	R	461.4696
##	9	Babius busteria	4.820332	26.42685	Mike I	R	482.2688
##	10	Polka dotdeadius	4.917620	28.16319	Sam I	В	534.9111
##	11	Polka dotdeadius	5.719096	25.66800	Sam I	В	659.3814
##	12	Felis bingus	5.719330	26.21354	Mike I	R	673.4507
##	13	Felis bingus	6.342199	21.41190	Lee I	N	676.4332
##	14	Polka dotdeadius	5.757274	29.84971	Lee I	N	777.0764
##	15	Felis lilacus	7.389150	18.16668	Mike I	R	779.0304
##	16	Felis bingus	5.153508	38.43704	Sam I	В	801.7626
##	17	Babius busteria	5.875977	29.60991	Lee I	N	802.9474
##	18	Polka dotdeadius	5.940968	29.89003	Mike I	R	828.5729
##	19	Felis bingus	6.153675	27.95617	Sam I	В	831.4511
##	20	Felis bingus	6.133290	29.51911	Mike I	R	872.1277
##	21	Polka dotdeadius	6.835866	24.20524	Mike I	R	888.3547
##	22	Felis bingus	5.908381	33.12830	Sam I	В	908.2931
##	23	Babius busteria	7.320403	21.83338	Lee I	N	918.9268
##	24	Alois gorus	5.387517	40.78054	Sam I	В	929.6515
##	25	Polka dotdeadius	6.932884	26.65574	Mike I	R	1006.2560
##	26	Alois gorus	6.431763	31.02211	Lee I	N	1007.9088
##	27	Felis bingus	5.940509	36.91567	Lee I	N	1023.1706
##	28	Felis lilacus	7.392085	23.91996	Mike I	R	1026.5599
##	29	Alois gorus	6.518064	31.98207	Lee I	N	1067.1701
##	30	Alois gorus	6.785557	29.52975	Lee I	N	1067.8754
##	31	Alois gorus	6.451524	32.67852	Mike I	R	1068.2598
##	32	Babius busteria	6.399220	33.69635	Sam I	В	1083.7442
##	33	Babius busteria	9.643333	14.93453	Mike I	R	1090.7767
##	34	Alois gorus	6.934553	29.44342	Sam I	В	1112.0264
##	35	Babius busteria	7.857736	23.94082	Lee I	N	1160.9775
##	36	Babius busteria	6.326452	37.72568	Lee I	N	1185.8982
##	37	Alois gorus	6.124179	40.53236	Mike I	R	1193.9537
##	38	Polka dotdeadius	7.386475	27.93317	Lee I	N	1196.9734
##	39	Polka dotdeadius	7.218228	29.68898	Lee I	N	1214.9160
##	40	Felis bingus	6.628480	35.45340	Lee I	N	1223.4205
##	41	Babius busteria	8.788819	20.67589	Sam I	В	1254.3396
##	42	Polka dotdeadius	7.628079	27.51920	Lee I	N	1257.6391
##	43	Polka dotdeadius	8.450271	23.29846	Sam I	В	1306.6473
##	44	Felis lilacus	7.377083	30.75200	Sam I	В	1314.4151
##	45	Felis lilacus	9.969012	17.54851	Lee I	N	1369.7282
##	46	Alois gorus	8.560933	23.80171	Lee I	N	1370.0622
##	47	Felis bingus	8.058693	27.67766	Mike I	R	1411.7199
##	48	Felis bingus	8.562402	25.16977	Sam I	В	1449.3070
##	49	Felis lilacus	8.387778	26.29771	Sam I	В	1453.1207
##	50	Alois gorus	8.265021	27.34622	Sam I	В	1467.1522
##	51	Felis lilacus	7.728383	32.44454	Mike I	R	1521.9791
I							

##		Alois gorus	8.121689	30.00446	Sam B 1554.4201	
##	53	Alois gorus	7.705967	33.38166	Mike R 1556.8690	
##	54	Babius busteria	7.747767	33.17067	Lee N 1563.8576	
##	55	Alois gorus	7.586411	35.27736	Sam B 1594.6255	
#	56	Polka dotdeadius	8.362663	29.16084	Sam B 1601.6923	
#	57	Babius busteria	9.647486	22.44429	Mike R 1640.6804	
#	58	Polka dotdeadius	7.857406	34.09647	Mike R 1653.3229	
##	59	Felis lilacus	8.357218	30.17040	Lee N 1654.9866	
##	60	Polka dotdeadius	10.674896	19.94432	Sam B 1784.9928	
##	61	Babius busteria	8.900486	28.94937	Mike R 1801.1772	
##	62	Polka dotdeadius	10.498876	20.91892	Sam B 1810.9847	
##	63	Felis bingus	8.748947	30.30355	Lee N 1821.7761	
##	64	Babius busteria	9.012599	28.63319	Lee N 1826.6684	
##	65	Felis bingus	7.913127	37.18024	Sam B 1828.5141	
##	66	Polka dotdeadius	8.315501	33.87201	Sam B 1839.5338	
##	67	Felis bingus	8.132326	36.51179	Sam B 1896.4988	
##	68	Alois gorus	8.029719	37.64523	Lee N 1906.3405	
##	69	Felis lilacus	9.218998	28.93624	Sam B 1931.5211	
##	70	Alois gorus	9.530325	27.39663	Lee N 1954.3507	
##	71	Felis bingus	9.544390	27.71285	Mike R 1982.7475	
##	72	Felis bingus	9.047865	31.30612	Mike R 2012.8496	
##	73	Alois gorus	8.972326	32.68559	Sam B 2066.5997	
##	74	Alois gorus	9.444699	30.14558	Sam B 2111.9803	
##	75	Polka dotdeadius	9.308741	31.05364	Lee N 2113.4126	
##	76	Alois gorus	8.067644	41.73071	Sam B 2133.2372	
##		Felis lilacus	8.749673	35.56346	Sam B 2138.3440	
##	78	Babius busteria	9.623791	29.41192	Lee N 2139.4667	
##	79	Alois gorus	8.560797	37.49364	Lee N 2158.1216	
##	80	Babius busteria	9.527949	30.45778	Lee N 2171.6355	
##	81	Babius busteria	9.493598	30.68464	Lee N 2172.0635	
##	82	Alois gorus	10.518580	25.29155	Mike R 2197.7562	
##	83	Felis bingus		34.55362	Lee N 2263.1533	
##		Polka dotdeadius	8.826686	37.16848	Sam B 2274.3645	
##		Felis bingus	8.371895	42.22421	Sam B 2324.3363	
##		Felis lilacus	9.310157	34.54994	Lee N 2352.0752	
##		Polka dotdeadius	9.349292	34.42306	Lee N 2363.1797	
##		Felis lilacus	11.242344	24.36627	Mike R 2418.7592	
##	89	Alois gorus	9.971449	32.08303	Sam B 2505.4275	
##		Felis bingus	9.915618	33.50866	Lee N 2587.5367	
##		Babius busteria	11.846130	23.72239	Mike R 2614.5756	
##		Babius busteria	9.950043	33.95577	Mike R 2640.3007	
##		Alois gorus	10.702706	29.66052	Sam B 2668.4300	
##		Felis bingus	12.088902	23.52084	Mike R 2699.7051	
##		Felis lilacus	9.447224	38.51855	Sam B 2700.0276	
##		Alois gorus	9.747507	39.96828	Sam B 2982.5822	
##		Babius busteria	12.380730	25.46397	Sam B 3065.5506	
##		Felis bingus	10.641437	35.87268	Sam B 3190.4669	
		Babius busteria	11.282547	35.44134	Mike R 3543.3518	
##	"					

Creating summary tables

A table showing average limb-volume by species:

```
LimbVolSpecAvg<-LimbData %>%
  group_by(Organism) %>%
  summarise("Average Limb Volume (cm^3)"=mean(Volume))
LimbVolSpecAvg
```

```
## # A tibble: 5 × 2
##
     Organism
                       `Average Limb Volume (cm^3)`
##
     <chr>>
                                               <dbl>
## 1 Alois gorus
                                               1604.
## 2 Babius busteria
                                               1680.
## 3 Felis bingus
                                               1564.
## 4 Felis lilacus
                                               1577.
## 5 Polka dotdeadius
                                               1342.
```

A table showing number of observations for each combination of species and observer:

```
LimbVolSpObCount<-LimbData %>%
count(Organism, Observer)
LimbVolSpObCount
```

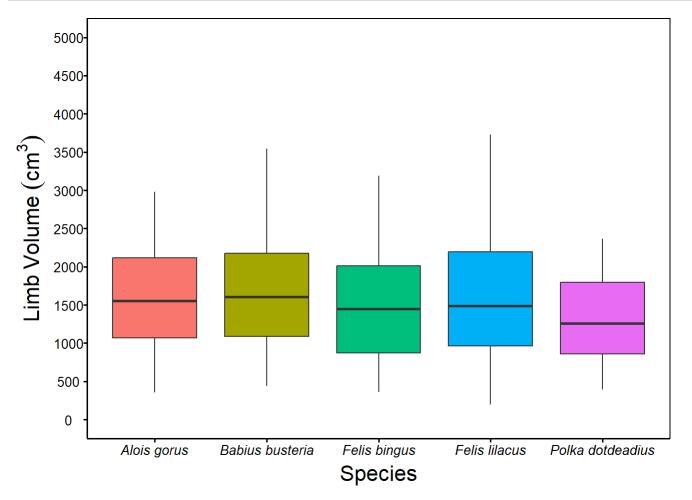
```
##
             Organism Observer n
          Alois gorus
## 1
                         Lee N 8
## 2
          Alois gorus
                        Mike R 5
          Alois gorus
                         Sam B 11
## 3
## 4
       Babius busteria
                         Lee N 9
## 5
       Babius busteria
                        Mike R 8
## 6
      Babius busteria
                       Sam B 3
## 7
         Felis bingus
                         Lee N 6
         Felis bingus
## 8
                        Mike R
## 9
         Felis bingus
                         Sam B 9
## 10
        Felis lilacus
                         Lee N 5
        Felis lilacus
## 11
                        Mike R
## 12
        Felis lilacus
                        Sam B 7
## 13 Polka dotdeadius
                         Lee N 6
## 14 Polka dotdeadius
                        Mike R 4
## 15 Polka dotdeadius
                         Sam B
```

Figures summarizing limb volume data

Box plot comparing limb volumes between species

```
VolBoxPlot<-ggplot(LimbData, aes(Organism, Volume, fill=Organism)) +
  geom_boxplot()+
  labs(x="Species", y=expression(Limb~Volume~(cm^3)))+ scale_y_continuous(limits=c(0,5000),break
s= seq(0,5000, by=500))+
  theme(axis.ticks=element_line(), axis.text.x=element_text(face="italic"))

VolBoxPlot</pre>
```



Frequency histograms of limb volume for each

species

