

STATISTICS FOR EES — EXERCISE SHEET 1

1. What is the best way to visualize a fraction? Explore this by visualizing the results in `http://evol.bio.lmu.de/_statgen/StatEES/bluearea_estimates_2019.csv`

- (a) visualize the data in several ways
- (b) check whether you should preprocess the data in some ways
- (c) discuss what to do with outliers
- (d) calculate mean values and standard deviations and interpret them appropriately
- (e) explore how the result depends on how you measure the error

Hint: The following command will read the data into R:

```
data <- read.csv("http://evol.bio.lmu.de/_statgen/StatEES/bluearea_estimates_2019.csv")
```

2. The file `swarth1.txt` contains beak lengths of Darwin finches (species *Geospiza fortis*) from three Galapagos islands¹ Compute mean, standard deviation, median, 25% quantile, and 75% quantile...

- (a) ... for the entire sample and...
- (b) ... separately for each island.

Hint: Read the data into R with the following command:

```
data <- read.table("http://evol.bio.lmu.de/_statgen/StatEES/15SS/swarth1.txt",h=TRUE)
```

3. With the data from exercise 2 draw histograms and boxplots...

- (a) ... for the entire sample and...
- (b) ... separately for each island.
- (c) Draw density polygons to compare the beak length distributions on the different islands.
- (d) Describe your observations in one or two sentences.

4. From `http://evol.bio.lmu.de/_statgen/StatEES/bluearea_estimates_2019.csv` or, if already available, from `http://evol.bio.lmu.de/_statgen/StatEES/bluearea_estimates_2021.csv` take the values estimated for figure 2 by the first five students A, B, C, D and E, and calculate

- with your pocket calculator (or only pocket-calculator like functions in R) the mean value, the median, the variance, the standard deviation and the standard error for these five values.
- Do the same with R with the functions that are available for this in R.
- Calculate these statistics for all students' estimations for figure 2.

¹H.S. Swarth (1931) The avifauna of the Galapagos Islands. *Oct. Paper Calif. Acad. Sci.*