

Definition: The mean is the sum of all values divided by the number of all values

For example, consider the following values: 2; 4; 8; 11; 12; 13; 14; 14; 23; 24

The mean is calculated as follows: $\frac{150}{11} = 14$

Download and open table 1 from the website

The **mean** is a measure of the **central tendency** of a *set of data*.

Table 1: Raw measurements of bill length in *A. colubris* and *C. latirostris*.

	Bill length (1mm)	
n	<i>A. colubris</i>	<i>C. latirostris</i>
1	13,0	17,0
2	14,0	18,0
3	15,0	18,0
4	15,0	18,0
5	15,0	19,0
6	16,0	19,0
7	16,0	19,0
8	18,0	20,0
9	18,0	20,0
10	19,0	20,0
Mean		
s		

Calculate the mean using:

- Your calculator
(*sum of values / n*)
- Excel

n = sample size. The bigger the better.
In this case n=10 for each group.

All values should be centred in the cell, with decimal places consistent with the measuring tool uncertainty.

=AVERAGE(highlight raw data)

The **mean** is a measure of the **central tendency** of a *set of data*.

Table 1: Raw measurements of bill length in *A. colubris* and *C. latirostris*.

	Bill length (± 1 mm)	
n	<i>A. colubris</i>	<i>C. latirostris</i>
1	13,0	17,0
2	14,0	18,0
3	15,0	18,0
4	15,0	18,0
5	15,0	19,0
6	16,0	19,0
7	16,0	19,0
8	18,0	20,0
9	18,0	20,0
10	19,0	20,0
Mean	<i>15,9</i>	<i>18,8</i>
s		

Descriptive table title and number.

Uncertainties must be included.

Raw data and the **mean** need to have consistent decimal places (in line with uncertainty of the measuring tool)

Table 1.xlsx - M

File Home Insert Page Layout Formulas Data Review View

PivotTable Table Picture Clip Art Shapes SmartArt Screenshot Column Line Pie Bar Area Scatter Other Charts

B14 fx =AVERAGE(B4:B13)

	A	B	C	D	G	I
3	n	<i>A. colubris</i>	<i>C. la</i>			
4	1	13,0				
5	2	14,0	18,0			
6	3	15,0	18,0			
7	4	15,0	18,0			
8	5	15,0	19,0			
9	6	16,0	19,0			
10	7	16,0	19,0			
11	8	18,0	20,0			
12	9	18,0	20,0			
13	10	19,0	20,0			
14	Mean	15,9	18,8			
15	s					

Scatter with only Markers
Compare pairs of values.
Use it when the values are not in x-axis order or when they represent separate measurements.

All Chart Types...

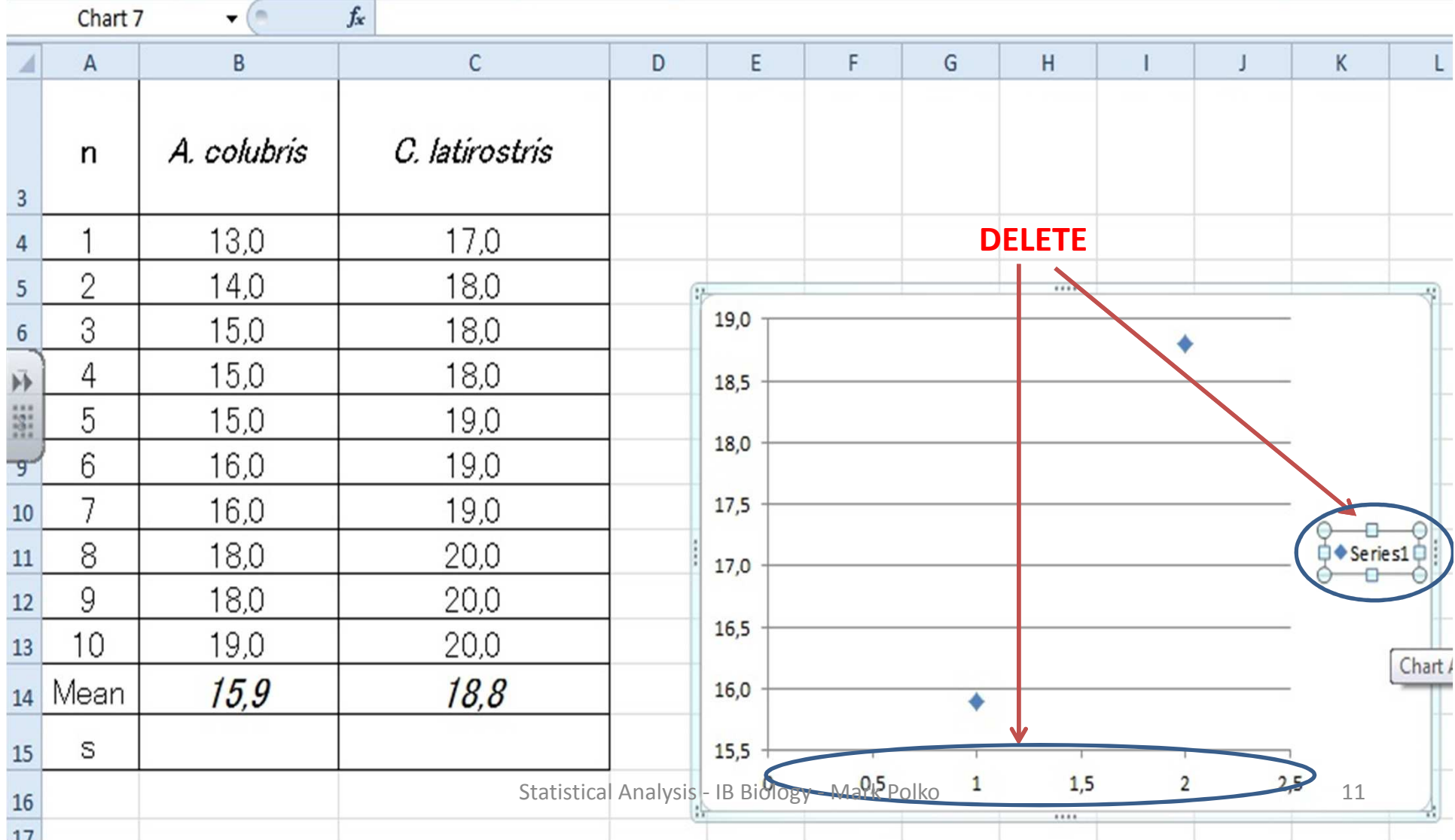
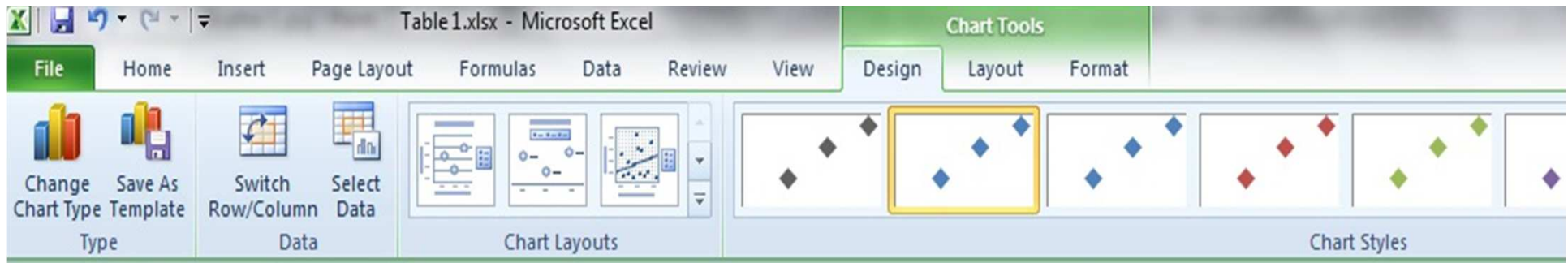


Table 1.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Design Layout Format

Change Chart Type Save As Template Switch Row/Column Select Data

Chart 7 f_x =SERIES(;;Sheet1!\$B\$14:\$C\$14

	A	B	C
3	n	<i>A. colubris</i>	<i>C. latirostris</i>
4	1	13,0	17,0
5	2	14,0	18,0
6	3	15,0	18,0
7	4	15,0	18,0
8	5	15,0	19,0
9	6	16,0	19,0
10	7	16,0	19,0
11	8	18,0	20,0
12	9	18,0	20,0
13	10	19,0	20,0
14	Mean	15,9	18,8
15	s		

Format Data Point

Series Options

Marker Options

Marker Fill

Line Color

Line Style

Marker Line Color

Marker Line Style


Shadow


Glow and Soft Edges







3-D Format

Marker Type

Automatic
 None
 Built-in

Type:  ▼

Size:  ▲ ▼

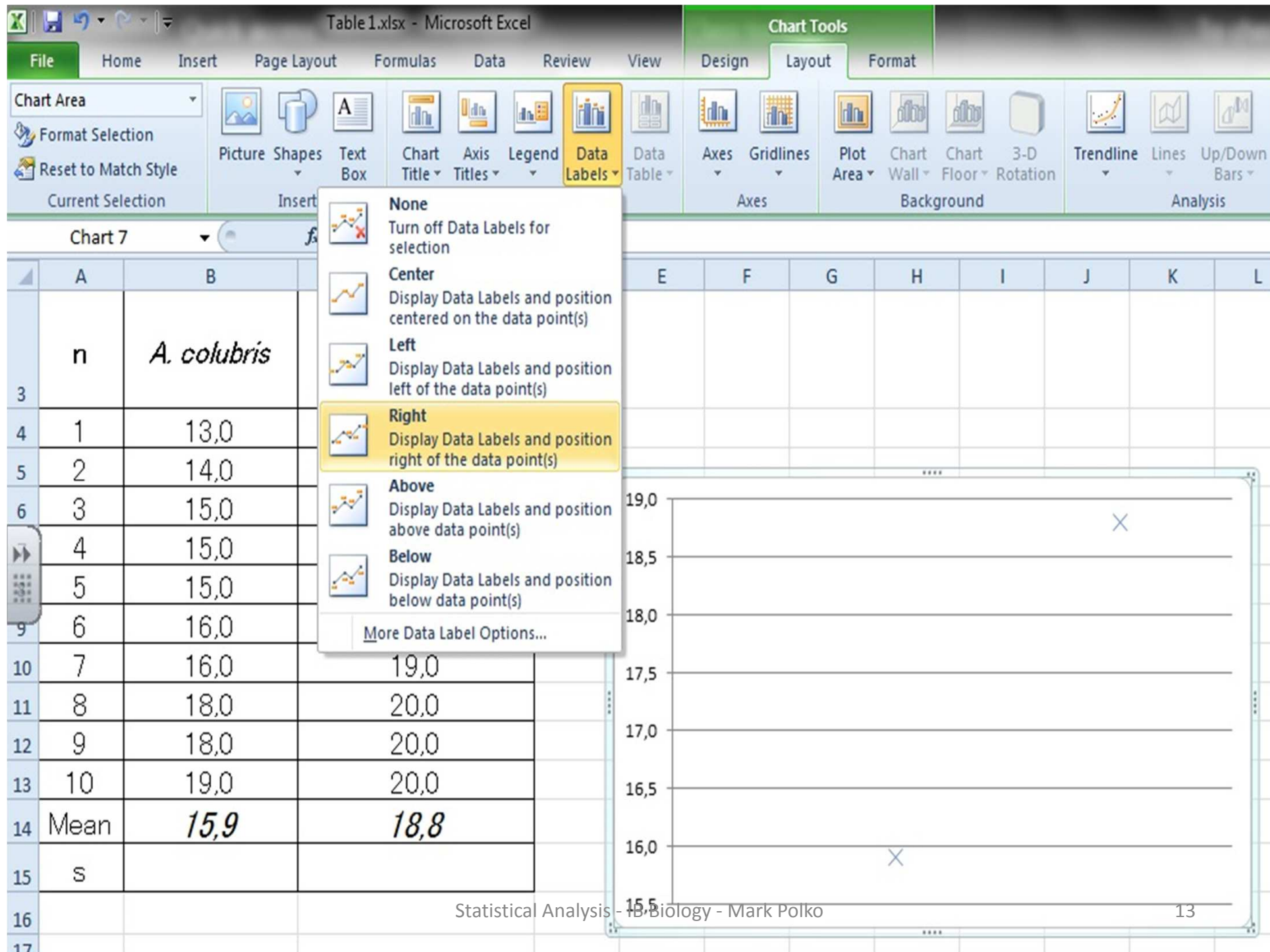
     

Double click on a marker to format.

Select the cross

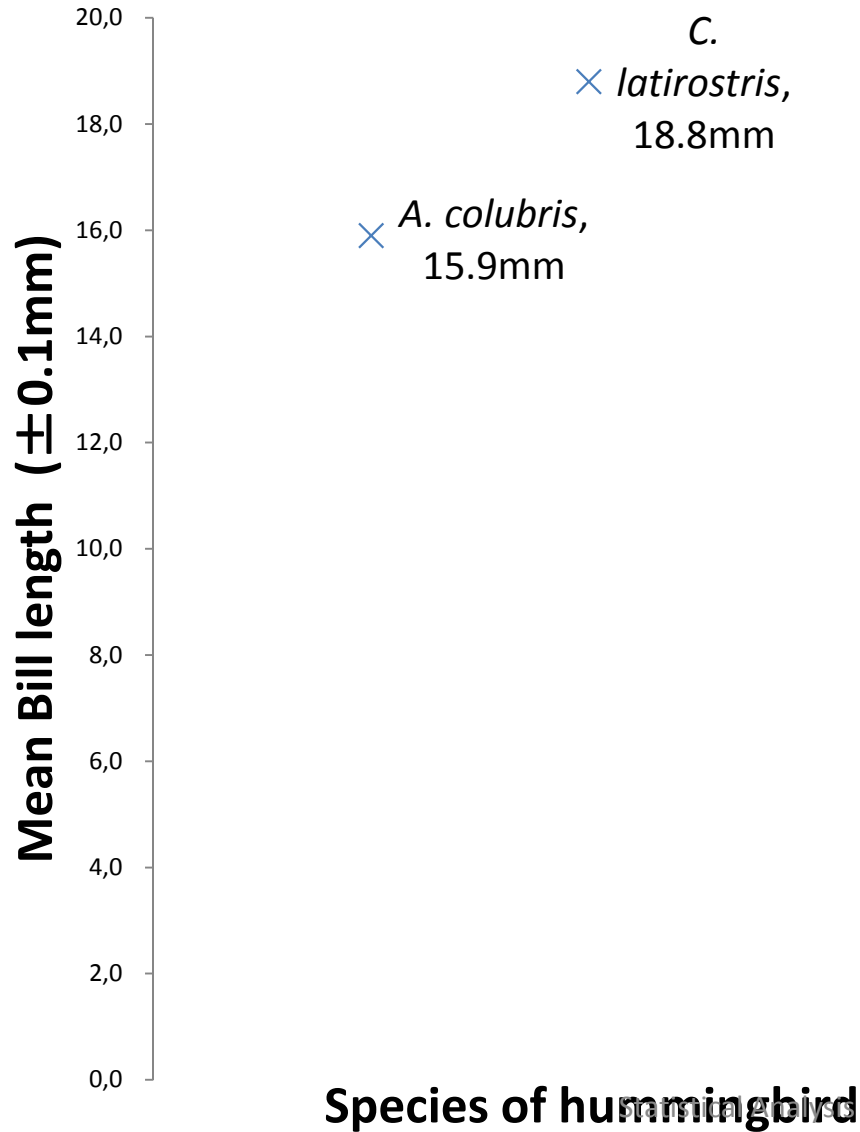
Statistical Analysis - IB Biology - Mark Polko

12



Try to get these done!

Graph 1: Comparing mean bill lengths in two hummingbird species, *A. colubris* and *C. latirostris*.



Descriptive title, with graph number.

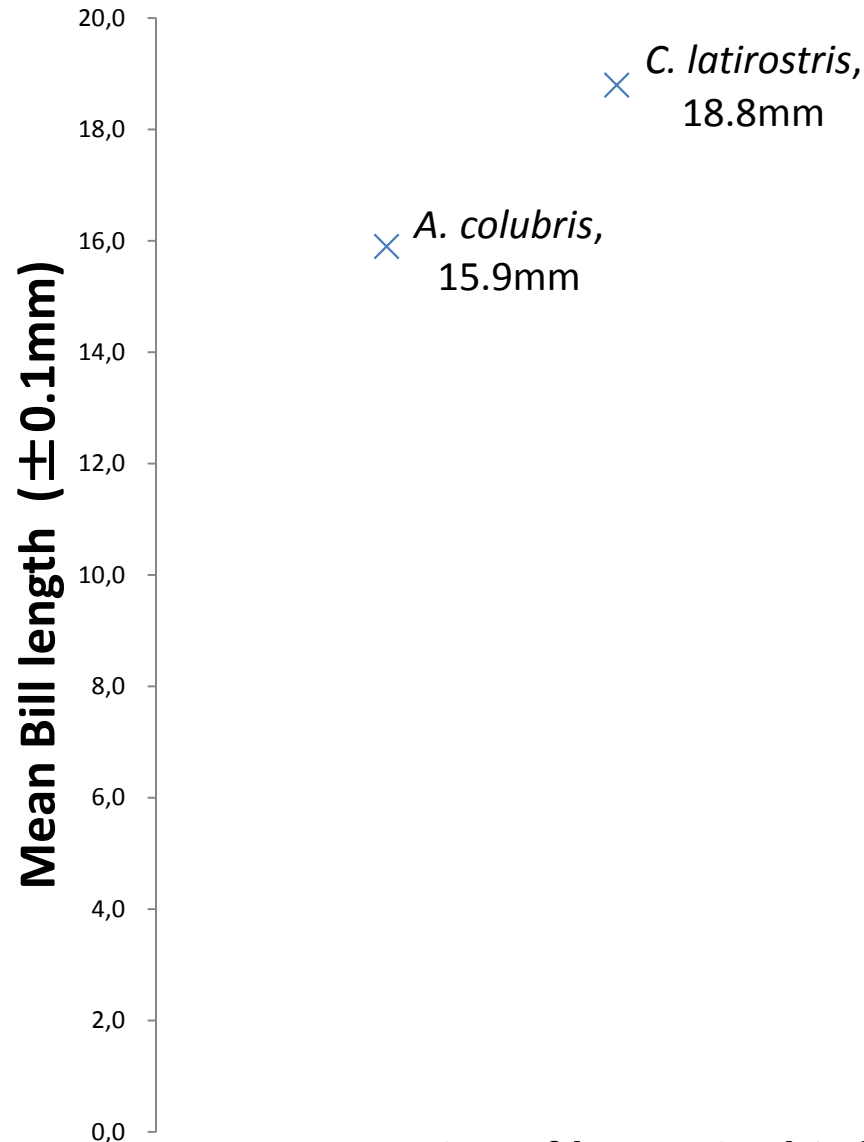
Labeled point

Y-axis clearly labeled, with uncertainty.

Make sure that the y-axis begins at zero.

x-axis labeled

Graph 1: Comparing mean bill lengths in two hummingbird species, *A. colubris* and *C. latirostris*.



From the means alone you might conclude that *C. latirostris* has a longer bill than *A. colubris*.

But the mean only tells part of the story.