**Math 338 – Chapter 2 – First: plot the data**

Creating a graphical representation of data can help us understand it. For complex data sets, plotting may be difficult, but techniques in data science will allow us to manipulate the data in order to ‘see’ it.

Plotting is the beginning of analysis, but should not be used for making decisions. Plotting the data may help you decide what sort of analysis is needed, which variables are good candidates for the analysis or whether there may be errors in the data. Decisions should be made on subsequent analysis

These exercises use very simple data sets to help us

* Begin a discussion of the techniques of data science.
* Practice finding out how to get help with R on your own.
* Practice using R.

In 1981, two new varieties of a tiny biting insect called a midge were discovered in the jungles of Brazil by biologists W. L. Grogan and W. W. Wirth. They dubbed one kind of midge an *Apf* midge and the other an *Af* midge. The biologists found that the *Apf* midge is a carrier of a debilitating disease that causes swelling of the brain when a human is bitten by an infected midge. Although the disease is rarely fatal, the disability caused by the swelling may be permanent. The other form of the midge, the *Af*, is quite harmless and a valuable pollinator. In an effort to distinguish the two varieties, the biologists took measurements on the midges they caught. The two measurements taken were wing length and antenna length, both measured in centimeters. The data are provided below.

***Af* midges**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Wing length (cm) | 1.72 | 1.64 | 1.74 | 1.7 | 1.82 | 1.82 | 1.9 | 1.82 | 2.08 |
| Antenna length (cm) | 1.24 | 1.38 | 1.36 | 1.4 | 1.38 | 1.48 | 1.38 | 1.54 | 1.56 |

***Apf* midges**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Wing length (cm) | 1.78 | 1.86 | 1.96 | 2.0 | 2.0 | 1.96 |
| Antenna length (cm) | 1.14 | 1.2 | 1.3 | 1.26 | 1.28 | 1.18 |

Is it possible to distinguish an *Af* midge from an *Apf* midge on the basis of wing and antenna lengths? Source: “The Midge Problem,” *Everybody’s Problems,* ***Consortium****,* Number 55, Fall, 1995, COMAP, Inc., Lexington, MA.