**Comparative Statistics: Mann Whitney u Test**

This is used to test the degree to which two sets of data are different from each other. Only two sets can be compared, but they can be of different sizes.

**Example: Does the length of grass affect the number of invertebrates found there?**

H1: The length of grass will affect the number of invertebrates found there.

Again, a null hypothesis must first be established:

H0: The length of grass has no effect on the number of invertebrates found there.

1. First, rank all of the values, as one list, irrespective of which sample they occur in.
2. Then sum the ranks. This has been done in the tables below:



1. Now calculate a value of u for each sample using this formula:

ux = nxny + nx(nx+1)/2 - Σrx

where ux = the u value for sample x

nx and ny are the number of values in samples x and y

Σrx is the sum of values for sample x

1. In this example u1 = (8\*8) + 8(8+1)/2 – 48 = 64 + 36 – 48 = 52

and u2 = (8\*8) + 8(8+1)/2 – 88 = 64 + 36 – 88 = 12

1. Ignore the bigger of the two u values and compare the smaller one against critical values in a table. To find the appropriate critical value read across to find the column for the number of values in sample 1 and then read down to the row showing the number of values in sample 2. The significance has been shown in %: 10% = a probability of 0.1 and 5% = a probability of 0.05.
2. Unlike other tests, the null hypothesis is rejected if the smaller u value is less than the critical value (at the level of significance you want).
3. Here, as 12 is smaller than 13 (the critical value at the 5%/0.05 significance level), we should therefore reject the null hypothesis and accept the alternate hypothesis.
4. The conclusion is that there is a highly significant difference between the two samples and that this data supports the idea that the length of grass does affect the number of invertebrates found there. Of course, it doesn’t tell you what the relationship is or why it might exist – but it does mean that your conclusions are likely to be valid.