

Turning your leaf measurements into real data

Biology 2005, October 8, 2014

Your leaf width and length measurements are in spreadsheets written by *ImageJ*. Each row contains a single measurement (width or length), and no explicit indication of the leaf's identity. (There's the arbitrary sequence number, and the JPEG file name that indicates the sheet, but not the actual leaf number.) To analyze your data in *R*, you will need to have all the information in a spreadsheet where each *row* contains *all* the information for a given *leaf*. And since we want everyone in the class to be able to analyze all of the data, we need to get everyone's data into the *same* spreadsheet. Here it is, with some *fake data* that illustrate what the columns mean.

	A	B	C	D	E	F	G	H	I	J
1	group	tree	date	sheet	leaf_#	damage	stunted	width	length	comment
2	9	1	9.3.14	1	1	0	n	45	49	a typical case
3	10	5	9.3.14	2	20	1	n	60	57	damage minimal
4	11	3	9.3.14	1	5	2	n	51	56	more damage, but W/L are OK
5	12	2	9.17.14	3	32	3	n			bad damage, can't be measured
6	13	1	9.17.14	1	9	0	y	35	24	stunting obvious
7	14	8	9.17.14	2	18	0	n	590	622	units are PIXELS, not mm!

This spreadsheet is on the course web site, at a link labeled "**The simplified leaf-spreadsheet template for 2014**". Please download a copy, delete the fake-data rows (2-7), and fill it in with your actual leaf data. The easiest and most accurate way to transfer your measurements will be to copy and paste the width and length numbers from the *ImageJ* results spreadsheets, using your annotated JPEG images as a guide to which measurements come from a given leaf, and which are width and length. *It's extremely important not to switch the width and length numbers*, so please be careful about this.

All columns should be set to type "text" (not number or "general"). The template is set up this way. If you have not accidentally changed its global data-type setting, then you'll see that in every column, what you enter becomes *left-justified* when you exit that cell.

Columns A, B, C, D. *Group, tree, date* and *sheet* will be the same for many consecutive rows, so you can fill them in by dragging. Please write the *collection date* as *mm.dd.yy*. This prevents Excel from converting it to Excel's private internal date format, which can cause major headaches later.

Columns E, F, G. You'll have to enter the *leaf numbers* individually and then code the *damage* and *stunting* from inspection of the JPEG image. The damage codes are as follows:

- 0 no significant tissue removed by herbivores or other violence
- 1 just a little nibbling or physical damage
- 2 significant removal of leaf area (say, more than 5%), but the measurements are good
- 3 so much damage that you couldn't reliably make one or both of the measurements

Stunting (y/n) means the leaf never reached a normal adult size or shape; it may appear "flat topped".

Columns H, I. *Width* and *length* should be in millimeters, but it's OK if you forgot to enter the scaling factor and *ImageJ* reported the measurements in pixels. We can automate the conversion later.

Column J. Please *note* anything unusual that isn't covered by your entries in the other columns.

Quality control. You will probably find it easiest to make these data spreadsheets on a per-tree basis, and save them in a folder for that tree on the biomicrolab server. After this has been done, someone in your group (ideally not the person who initially made the spreadsheet) should *review* it, leaf by leaf, to check for obvious errors. Is every leaf accounted for, just once? Are the width and length numbers in the correct columns? Do they have plausible values? This is important!

Combine your trees into a group-level spreadsheet. This is easy. Someone with good hands just needs to copy and paste the trees, in order, into a new sheet. Remember to save it by a *new name!*