Biofouling Tutorial

Dr. Linda Auker

5/7/2019

## Analysis of Community Settlement Panels

This site contains tutorials for photographing, analyzing, and visualizing data for assessing biofouling on panels.

Go to Option 1: drawing lines around organisms Go to Option 2: using a grid to count frequency of organisms

## Option 1: drawing lines around organisms

Pros: More accurate. Cons: Time-consuming, particularly for heavily settled panels.

## Photographing panels

1. Photograph both sides of each panel clearly. The more light available and the closest you can get to the panel without cropping it out will make it easier to analyze. Use the highest resolution on your smartphone or digital camera.
2. Send the labeled photos to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or add to a dropbox?). Suggested labeling includes depth\_side\_replicate. So a shallow panel front might be Shallow\_front\_1, and the other side of the panel is Shallow\_back\_1.

**Analyzing panel photographs in ImageJ** 1. Download ImageJ, a free open-source image analysis software available from NIH, at <https://imagej.nih.gov/ij/download.html>.

1. Open the program. Go to File > Open and find your photograph in the directory. Once you open your photograph, zoom in or out as needed to ensure the entire panel is visible on your screen and you are able to see the organisms clearly.
2. Set the scale of your image. First, choose the “Straight Line” shape and draw a line along one edge of your panel.

Figure 1

Figure 1

Next, go to Analyze > Set Scale… . In the dialog box, the program gives you the distance in pixels of the line you have drawn. In “Known distance” enter the length of the panel (10) and in “Unit of length” enter the units used (cm). Click ok.

1. Now you can start analyzing your panel photograph. Click freehand selection (Figure 2). Carefully, with your mouse, draw a line around a colony. Try to get as close to the edges as you can (Figure 3). If you make an error, let go of the mouse, left-click on the photograph and your line will disappear and you can try again. Now, go to Analyze > Measure. Under Area you will see the area your drawn line covers. This is the area, of your colony.

Figure 2

Figure 2

Figure 3

Figure 3

1. Repeat step 4 with a different colony. Notice that if you didn’t close the “Results” dialog box, your first measurements are still there.
2. Repeat until you have measured all species on the panel.
3. It’s very likely you will have more than one colony of the same species, or more than one area value for the same species. Make sure to add these up before recording on your spreadsheet for analysis. For example, for one colony of *Botrylloides violaceous*, you may have an area value of 4.35. For another colony of this species, the area is 1.53. Therefore, the total area is 5.88.

## Recording data in a spreadsheet

Record your data in a spreadsheet. You will want to include Date, Panel number and identification, side, depth, species, and area for variables. Figure 4 below shows a suggested format for data entry. (DMC = Darling Marine Center)

Figure 4

Figure 4

## Visualizing data

1. Be sure to save your

## Statistical analysis

## Option 2: using a grid to count frequency of organisms

Pros: Faster processing. Cons: With a sparsely populated panel, some species may be missed.