**Activity: Photoquadrats**

Photoquadrats are life-sized photographs sized to fit the dimensions of a quadrat. Photoquadrats allow you to compare quadrat data collection methods and practice identifying organisms.

**Materials**

* Quadrat
* Photoquadrat
* Photoquadrat Data Sheet
* Pencil
* Skewer
* Reference materials

**How to Construct OPIHI Photoquadrats**

There are seven OPIHI photoquads. Each photograph is cut in two, thus there are 14 pages of photoquad pictures in the adobe file “photoquads”. Each page should be printed so the photograph measures 12” by 6”. Then the two sides of the photoquad must be aligned before laminating. The photoquads are in order in the file, thus photoquad one is on pages one and two of the adobe file, photoquad two is on pages three and four, etc.

**Note on species identification**

The photoquadrat data sheet lists most of the species found in the TSI photoquadrat pictures. These pictures were taken in the Hawaiian intertidal. However, not all of the species on the pictures are easily found in reference materials. For example, blennies and gobies, two types of fish depicted on the photoquadrats, are not included very often in Hawaiian fish identification guides. When identification guides have pictures of these types of fish, they often do not include species that are common in the intertidal (the ones on the TSI photoquadrat pictures). However, you can still look at reference materials to get a general idea of the morphology of each of these types of fish and identify them to genus. In general, blennies have narrow bodies and are often seen peering from holes in the reef. They have a characteristic alert, curious expression. Intertidal gobies are small and very well-camouflaged. Gobies have compressed bodies and are blunt-headed.

Algae can also be difficult to identify in photos. Only three species of algae are listed to genus on the data sheets because the characteristics that are used to identify algae are often too small to clearly see in a photoquadrat. If you cannot identify something, you should describe it in as much detail as possible and list it in one of the blank species lines on the data sheet. Then, if you come across it again, you can include it on the same line.

**Procedure**

1. Center the quadrat over the photoquadrat.

2. Collect both point count and quadrat percent cover data (Table 1, columns “point count” and “percent cover”). You can also choose to do the quadrat percent squares modification and still record data in “percent cover” column. Use a skewer to assist in determining what organism or substrate is directly below a quadrat intercept.

3. Determine total percent cover of each organism and substrate category so the two quadrat methods can be compared.

a. Determine the percent cover of the point counts (column “Point Count Percent (%) Cover”)

b. *Only if you did the percent cover squares modification*, determine the percent cover (column “Squares Percent (%) Cover”)

4. *Optional:* Analyze another photoquadrat.

**Activity Questions**

1. Compare the quadrat point intercept and quadrat percent cover data. What are the similarities and differences in the data?
2. In this activity, what were the pros and cons of each quadrat method? Which method did you think was best suited to the task? Explain.
3. If a photoquadrat has been analyzed multiple times by different group, compare data. Why are there differences between groups when the picture was the same?

**Table 1.** Photoquadrat Data Sheet

**Point Counts-**Count the species directly underneath each point where the strings cross; make a hatch mark for each point corresponding to category. You should have **25** points total.

**Percent Cover-**Estimate how much cover each category represents. Percentages should add up to **100.** If using the squares modification, the number should add up to the number of squares in your quadrat.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Point Count** | **Point Count Percent (%) Cover** | **Percent Cover** | **Squares**  **Percent (%) Cover *(only if did squares modification)*** |
| **Algae** | *Padina sp.* |  |  |  |  |
|  | *Turbinaria ornata* |  |  |  |  |
|  | *Sargassum sp.* |  |  |  |  |
| Other algae  (write in) |  |  |  |  |  |
|  |  |  |  |  |  |
| **Cnidarians** | *Aiptasia pulchella* |  |  |  |  |
| **Echinoderms** | *Tripneutes gratilla* |  |  |  |  |
|  | *Echinometra mathaei* |  |  |  |  |
|  | *Echinometra oblonga* |  |  |  |  |
|  | *Holothuria hilla* |  |  |  |  |
|  | *Holothuria cinerascens* |  |  |  |  |
|  | *Actinopyga obsesa* |  |  |  |  |
|  | *Actinopyga varians* |  |  |  |  |
|  | *Ophiocoma erinaceus* |  |  |  |  |
| **Molluscs** | *Conus abbreviatus* |  |  |  |  |
|  | *Conus flavidus* |  |  |  |  |
|  | *Turbo sandwicensis* |  |  |  |  |
|  | *Cypraea schilderorum* |  |  |  |  |
|  | *Nerita picea* |  |  |  |  |
|  | *Littoraria pintado* |  |  |  |  |
|  | *Aplysia dactylomela* |  |  |  |  |
| **Arthropods** | *Platypodia eydouxii* |  |  |  |  |
|  | *Calappa gallus* |  |  |  |  |
| Other inverts (write in): |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **Fish** | *Gymnothorax eurostus* |  |  |  |  |
|  | *Cirripectes sp.* |  |  |  |  |
|  | *Bathygobius sp.* |  |  |  |  |
| Other fish  (write in): |  |  |  |  |  |
|  |  |  |  |  |  |
| **Substrate** | Sand |  |  |  |  |
|  | Bare Rock |  |  |  |  |
| Other substrate (write in): |  |  |  |  |  |
|  | **QUADRAT TOTAL** |  |  |  |  |

**Activity Questions Answers – Teacher Text**

1. Compare the quadrat point intercept and quadrat percent cover data. What are the similarities and differences in the data?

*Answers will vary.*

1. In this activity, what were the pros and cons of each quadrat method? Which method did you think was best suited to the task? Explain.

*In general,* ***Quadrat******point intercept*** *can miss species that are less abundant and not under an intercept. However, it is accurate, easy to replicate, and there is not much room for error as you only count what is under the point.* ***Quadrat percent cover*** *is a little slower, but you get more information. It allows you to account for every species present in a quadrat, but there is some uncertainty and a larger degree of error because you are estimating.*

1. If a photoquadrat has been analyzed multiple times, compare data. Why are there differences when the picture was the same?

*Differences are common and expected due to identification differences, slight shifts in the quadrat position, and different groups seeing things different ways. This is true in the field as well. The same group, if they take data on the same photoquadrat tomorrow, will probably have slightly different data than the first day! This is the nature of sampling. However, if the data is very different on the same photoquadrat from different groups, the class should try to come up with ways to standardize their methods to narrow the difference gap between groups.*