C14 Samples from *Arctica islandica*

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Goal

The goal is this project is to collect C14 samples from shells of *Arctica islandica* (Ocean Quahog) as a means to determine the time scale of when quahogs were thriving in various areas of the Mid-Atlantic. Quahogs can live to be hundreds of years old; the oldest *A. islandica* known is over 500 years old. We would like to take alive and dead quahog shells from known areas of present and past quahog grounds and date them according to their C14 analysis.

Methods

Quahog shells will be collected from various locations in the Mid-Atlantic. The shells will be cleaned of bio-fouling via 10% bleach solution and placed on trays to dry overnight. The quahogs will be cut, ground, polished, and imaged to determine age of each specimen (Figure 1). Once imaged, C14 "dust" will be collected and sent to the University of California Irvine for analysis.

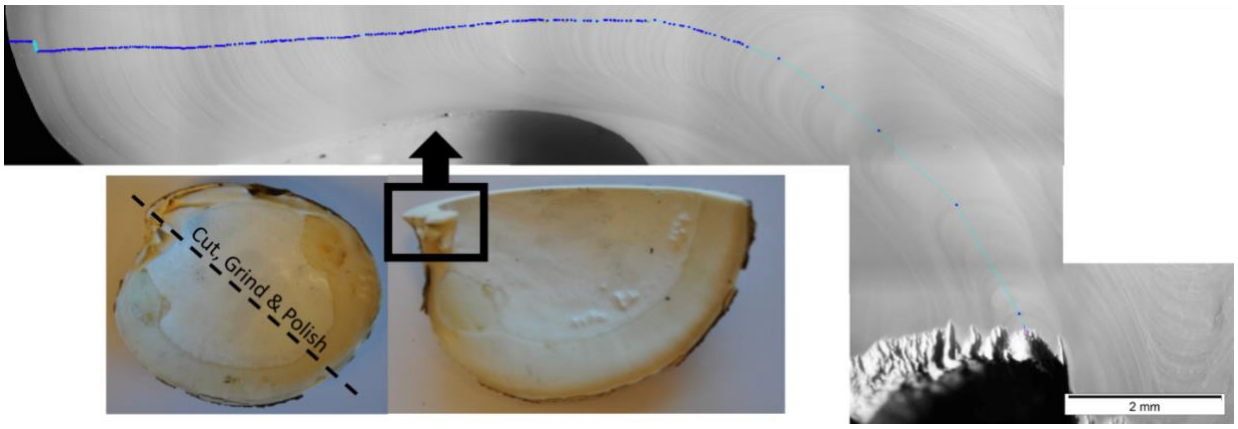

Figure 1: Example of *Arctica islandica* shell in the various stages of aging. The 2017 Long Island shell was determined to be 270 years old.

1. Prepare shell samples. For more information on this please refer to 2019-1 Aging of Clams Protocol on the VIMS Molluscan Ecology Website. https://www.vims.edu/research/units/labgroups/molluscan_ecology/publications/index.php
2. Select the shell half without the origin for C14 sampling.
3. Perform the first grind step (240 grit sandpaper) on this shell half to remove any debris from cutting.

4. Gather C14 collection supplies: weighting paper (Figure 2), gloves, scale, black sheet of paper, Dremel tool, and 2.0 mL centrifuge tubes.

Figure 2: Example of weighing paper for C14 "dust" collection.

5. Remember to wear gloves to prevent sample contamination and fingerprints on the weighting paper.
6. For each C14 sample, fill in the data sheet (Table 1) with all pertinent shell information, such as, C14 collection sample number, year, station number, shell number, left/right hinger, number of grams of C14 sample collected, and any relevant notes. Repeat with each sample.

Table 1: Example of data table for shell sample information

2nd Round of C14 Collection						
Sample #	**Year**	**Station #**	**Shell #**	**L/R?**	**Grams**	**Notes**

7. Set up sample collection area. Place all items close to you for easy access. This will help eliminate loss of C14 "dust" collection when transferring the sample to the scale and into the centrifuge tube.
8. Place a blank sheet of paper on the lab bench near the scale. This is where you will Dremel the shell and collect the C14 "dust". By placing a blank paper on the lab bench and working on top of it, your sample can be easily recollected if you were to accidently blow some of the sample off the weighing paper. Next, take two sheets of weighting paper. Place the first sheet on scale and tare, then place the second sheet in the center of black paper (Figure 3).

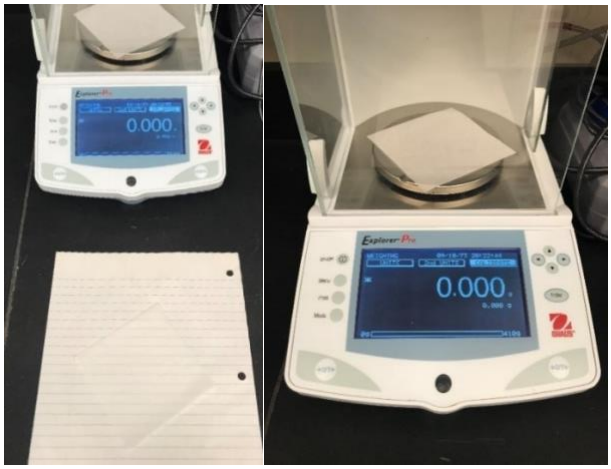

Figure 3: Example of Step 8 with scale, weighing paper, and blank sheet of paper.

9. Clean the Dremel tip with a Kimwipe before/after each sample to avoid cross contamination.
10. Take the shell half without the origin and hold over weighting paper centered on the blank paper. Put the tip of Dremel on shell hinge and grind the center of the hinge over weighting paper (Figure 4). Remember to avoid blowing the "dust" off the paper by blocking the Dremel fan when holding the tool in your hand.

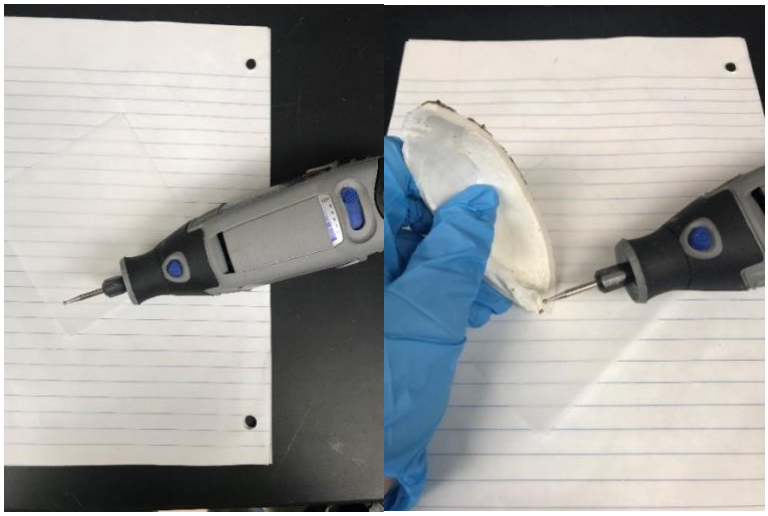

Figure 4: Dremeling the C14 collection from the shell.

11. Continue to grind hinge with Dremel until a small mound of shell "dust" has accumulated on the weighting paper. Remove pieces of periostracum and external shell fragments from sample.
12. Pour dust onto the weighting paper on the scale and record final weight on data sheet next to associated sample number. You need to collect approximately 0.015 – 0.020 grams for analysis.
13. Label a centrifuge tube with sample number.
14. Take weighting paper off scale and fold the sheet in half without creasing paper and pour C14 sample into labeled centrifuge tube (Figure 5).

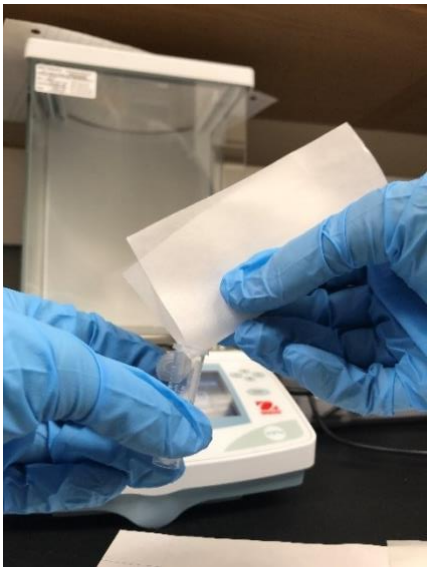

Figure 5: Demonstration of transfer of C14 "dust" from weighing paper to collection tube.

15. Repeat Steps 9 – 14 for all shell samples. Place all centrifuge tubes in a labeled Ziplock bag with collection name. Example: 2019 Old Betty C.
16. Send samples to a C14 lab and wait for results.