ARMS Processing – Fraction Sieving

 Make sure that all the containers and tools used have been bleached and rinsed between ARMS processing. Wear gloves at all times; do not touch the water or the plates with bare skin.

This step will separate the motile organisms from the ARMS disassembly water tub into three size fractions. The 106µm - 500µm fraction and the 500µm - 2 mm fractions will be bulk fixed during this step while the >2 mm fractions will be processed during the next step.

Materials:

- Laboratory gloves
- 1 ARMS recovery bin containing the water where the ARMS was disassembled
- 1 clean empty bin
- 1 water pitcher
- 106-µm sieve
- 500-µm sieve
- 2-mm sieve
- 3 photo trays (11″ x 14″) containing 1/2-Liter filtered seawater
- 1 bubbler with tubing and 3 air stones* placed in each tray
- 2 squeeze bottles filled with filtered seawater
- 2 squeeze bottle filled with 90% ethanol
- 2 fitted PVC pipes (~15cm long)
- 2 pieces of nytex 40-µm mesh
- 2 spatulas (clean or disposable)
- 1 waste bucket
- 10 (or more) 50-mL Falcon tubes (depending on the volumes of the 100 and 500-µm fractions
- Pencils, markers, laboratory tape, parafilm

Procedure:

1. Place a clean and empty bin next to the disassembly bin filled with seawater where the ARMS was disassembled. Place an air stone in the new bin
2. Place the 2-mm sieve on top of the 500-µm sieve and start transferring the water from the ARMS bin into the empty bin through the sieves using the water pitcher

3. The water and sediment must pass through the sieves. If needed, use the water from the new bin to rinse the ARMS bin
4. Once the ARMS bin is empty and all its content was passed through the sieves, carefully rinse both sieves using water from the new bin. This step is important as we want to make sure that the sizes in each fraction are homogeneous
5. Transfer the content of the 2-mm sieve into a photo tray containing filtered seawater and an air stone. If animal get trapped in the net, carefully remove them using fine tweezers or by squirting water underneath the animals with the squeeze bottle. Set this fraction aside until further processing.
6. Transfer the content of the 500-µm sieve into a new photo tray containing filtered seawater and an air stone
7. Place the 100-µm sieve under the 500-µm sieve and transfer the water content of the new bin back into the empty ARMS bin through the sieves using the water pitcher
8. The 100-µm sieve will fill very quickly, make sure that the water has passed through the sieve before refilling or it will overflow. To help with this step, the person transferring the water into the sieve can tap with their fingers the bottom of the 100-µm sieve until the water has entirely flown through.
9. Sieve all the water and sediment
10. Rinse carefully the two sieves with the ARMS bin water to wash away smaller sediment
11. Remove the 500-µm sieve and empty its content into the photo tray containing the first round of 500-µm organisms. Use the squeeze bottle to help with removing the organisms trapped in the net
12. Wash carefully the 100-µm sieve by submerging the base of the sieve into the ARMS bin water and slowly shaking it to remove smaller sediment
13. When the fraction is clean from smaller sediment, transfer the content of the 100-µm sieve into a new photo tray containing filtered seawater and an air stone. Use the squeeze bottle to help with removing the organisms trapped in the net
14. Place a 40-µm nytex mesh between two fitted pieces of PVC pipes and pass the content of the 500-µm fraction through the system to concentrate this fraction. Rinse the tray with the seawater squeeze bottles in the system. You can use a spatula to stir the material to facilitate the filtering. Once all the content is contained on the nytex, rinse the fraction with 90% ethanol
15. In the tray, open the pipe system to free the nytex mesh containing the 500-µm fraction. Transfer this fraction into the falcon tubes in batches of 10-mL. Fill the falcon tube with 90% ethanol. Use as many falcon tubes as needed
16. Rinse the thread of the falcon tubes using 90% ethanol to remove residues, close the tubes and wrap the lid with parafilm. Shake vigorously to homogenize. Label the tubes and place in the freezer
17. Repeat steps 14 to 16 for the 100-µm fraction

Illustrations:

Sieving the water content of the ARMS retrieval tub into a new clean tub

The three fractions collected with the 2-mm Sieve (left) 500-µm sieve (middle) and the 106-µm sieve (right)

The 500-µm and 106-µm are concentrated on a 40-µm nytex mesh

Both fractions are fixed in 90% ethanol