

# Description and shell repair rate of experimentally damaged young Gaper clams (*Tresus capax*)

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## Purpose

To determine if 1 – 2 year old Gapers are able to survive minor damage and to describe their general process of shell repair

Recreational limit of 12 gapers allowed daily  
Clammers required to take all clams dug but not strictly enforced and/or may miss smaller clams in the harvesting process

Size thought to be big enough to “show” and be dug up but too small to be harvested by recreational clammers

Smaller clams often have more fragile shells

## Methods

### Gaper Collection and Care

- Undamaged Gapers collected from Coos Bay, OR  
Between 70 – 90 cm length; 40 – 50 cm width; 85 – 160 g weight
- Clams were housed in individual containers with 4 cm of sieved sand in a flow-thru seawater table under ambient light conditions
- Average temperature was 10 °C and average salinity was 32 psu.
- Clams were additionally fed 25 ml of Instant Algae - Shellfish Diet 1800© (ReedMaricultureInc.) approximately every 5 days

### Damage

- Haphazardly chosen for treatment with 8 clams in 3 treatments
- All damage was performed to left valve towards the middle of mantle edge
- Cut:** with fine blade hacksaw, avg. length of cut 9.8 mm  
Shell was “scratched” beyond cut and total avg. length was approximately 17.2 mm
- Crush:** tapped with a hammer repeatedly in the same place until small break occurred
- Control:** handled out of water approximately the same amount of time as treated clams
- Clams were measured (length, width, and weight) and photographed every 10 days for ~ 4 months.  
Length (anterior to posterior measurement of left valve)  
Width (distance through fattest point of left and right valves)

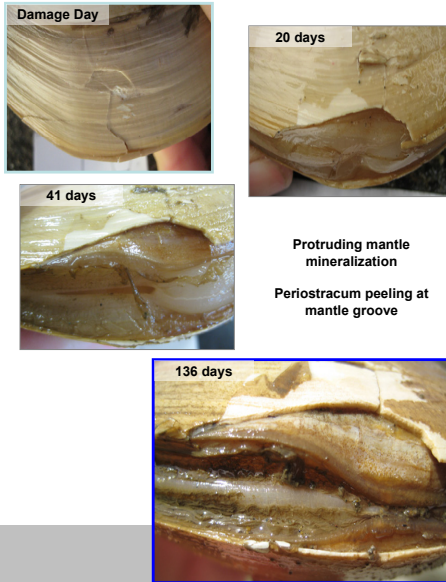
## Discussion

- ~ 38% of all clams died
- After four months clams were not fully healed and there was no measurable change in shell length or whole wet weight.
- Mortality was approximately equal among treatments and controls suggesting that minor damage itself is not lethal
- There may be a long-term fitness cost in growth rate over long time periods
- Captivity may effect shell formation and repair
- Further studies should be performed over a longer recovery period to ascertain growth differences
- Suggest histological and microstructural experiments

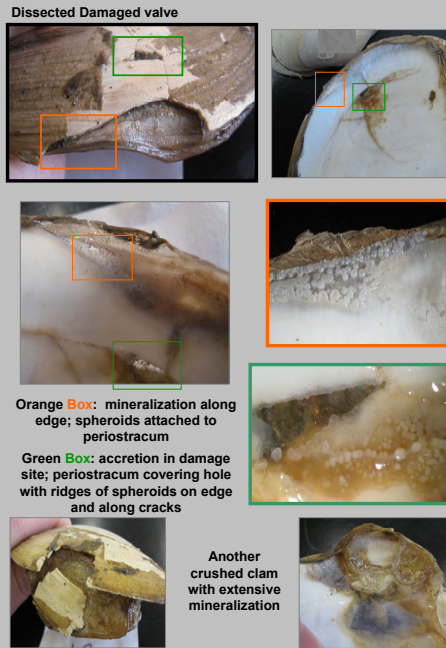
## Descriptions

- Crushed clams have little to no growth on the undamaged valve
- Crushed or Cut clams have “Pocket Growth” on damaged valve
- Ridge at pallial line may be associated with “Pocket Growth”
- Some growth patterns may be an artifact of captivity

## Crush



Protruding mantle mineralization  
Periostracum peeling at mantle groove



Orange Box: mineralization along edge; spheroids attached to periostracum

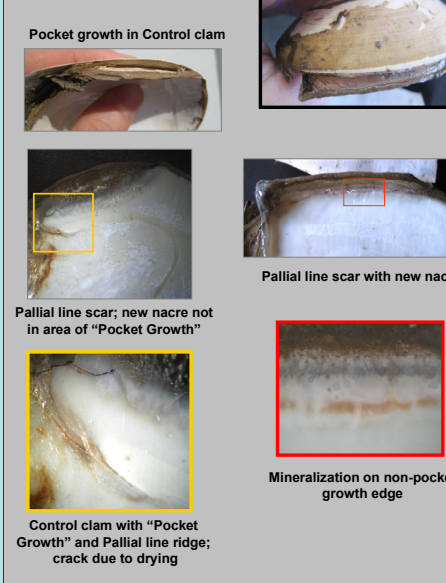
Green Box: accretion in damage site; periostracum covering hole with ridges of spheroids on edge and along cracks

Another crushed clam with extensive mineralization

## Control



No mineralization  
No periostracum peeling



Pocket growth in Control clam

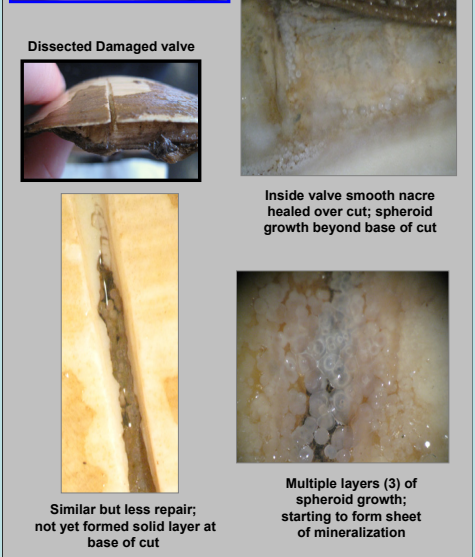
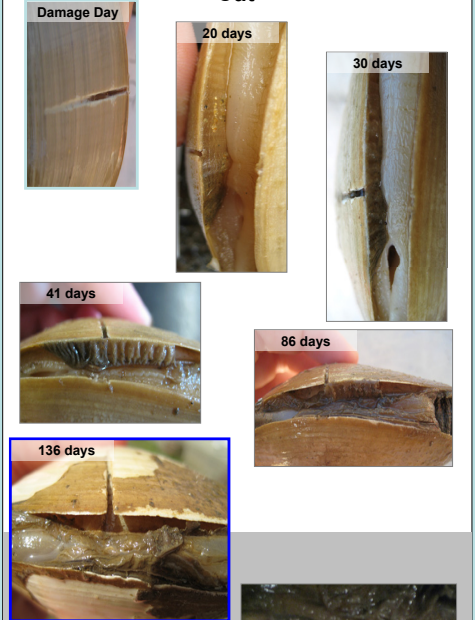
Pallial line scar; new nacre not in area of “Pocket Growth”

Pallial line scar with new nacre

Mineralization on non-pocket growth edge

Control clam with “Pocket Growth” and Pallial line ridge; crack due to drying

## Cut



Inside valve smooth nacre healed over cut; spheroid growth beyond base of cut

Similar but less repair; not yet formed solid layer at base of cut

Multiple layers (3) of spheroid growth; starting to form sheet of mineralization