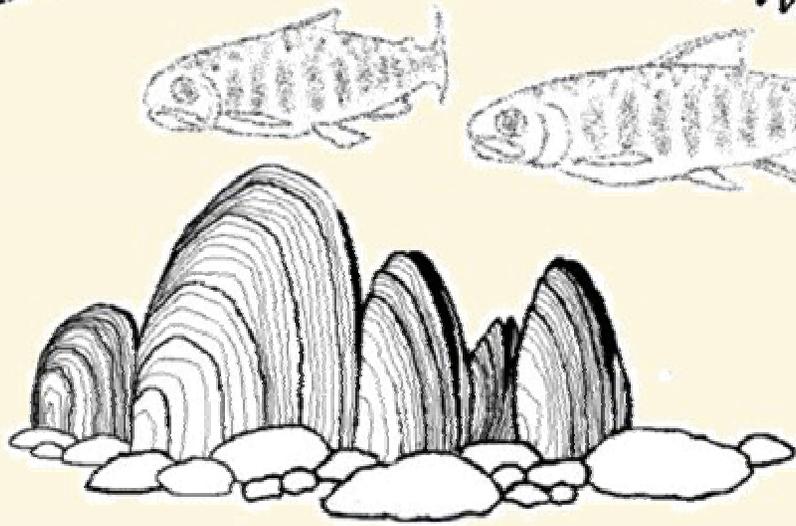


Pacific Northwest Native Freshwater Mussel Workgroup



## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

(break, if needed)

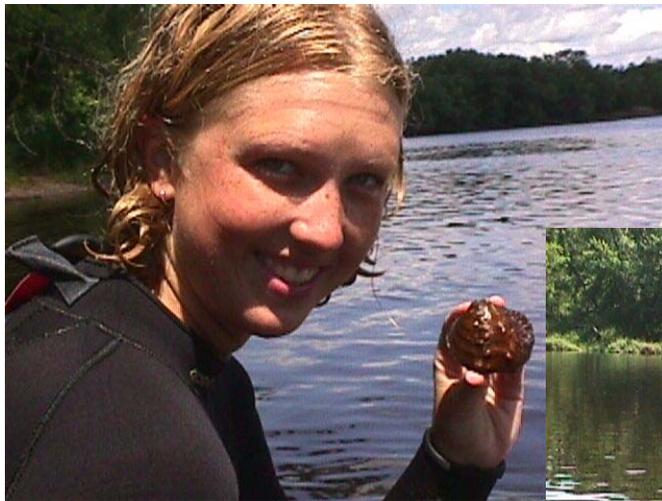
## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory



# Preserving mussel tissue

- study objectives - current & future
- species distribution - vouchers
- taxonomy - genetics, anatomy
- toxicology



# Preserving mussel tissue

(1) whole animals or valves - museums

(2) tissue samples - genetic analysis

(3) laboratory

(break, if needed)

## Estimating mussel age

(1) external valve characters

(2) internal valve characters

(3) laboratory



# Preserving mussel tissue

- (1) whole animals or valves - museums
  - (a) permit - cover study objectives
  - (b) sample containers - wide mouth, 2°
  - (c) peg valves open!
  - (d) < 24 hr, replace ethanol, 10:1
  - (e) label jar - review museum needs
  - (f) submit report or paper with vouchers



# Preserving mussel tissue

(1) whole animals or valves - museums

(a) permit

(b) containers - 1 gal. zip-lock, freezer bags

(c) label bag - review museum needs

(d) 2° containment - prevent crushing

(e) submit report or paper with vouchers

- coating shells



E. Galbally



J. Hartsock

# Preserving mussel tissue

(1) whole animals or valves - museums

**(2) tissue samples - genetic analysis**

(3) laboratory

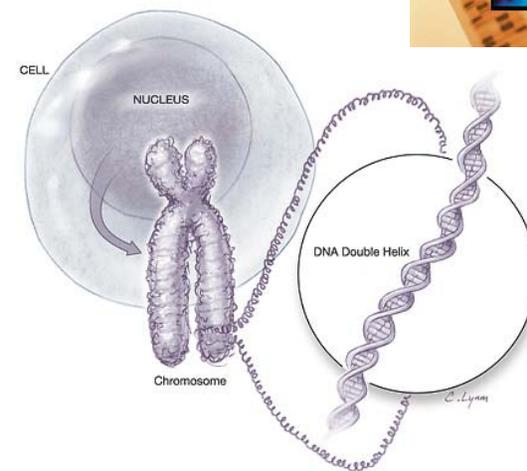
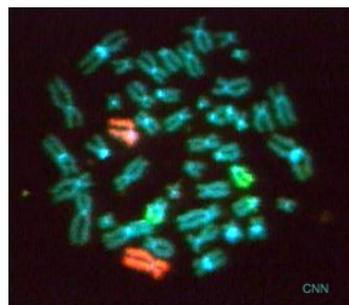
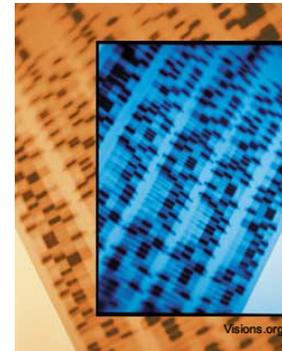
(break, if needed)

Estimating mussel age

(1) external valve characters

(2) internal valve characters

(3) laboratory

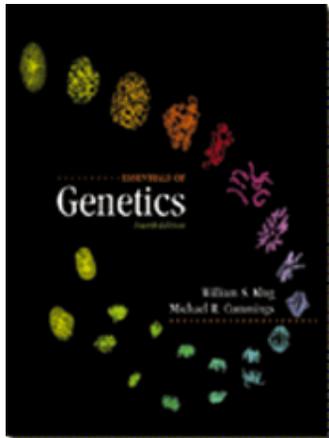


# Preserving mussel tissue

(1) whole animals or valves - museums

(2) tissue samples - genetic analysis

- high quality tissue - fresh, deep frozen
- quick processing - ethanol, -20 °C



# Preserving mussel tissue

(1) whole animals or valves - museums

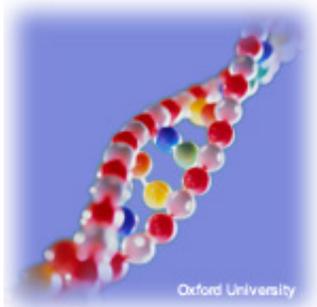
**(2) tissue samples - genetic analysis**

(a) permit - state, federal, tribal, etc.

(b) containment:  $-80^{\circ}\text{C}$ , ethanol (10:1)

(c) tissue collection - anterior mantle,  
avoid contamination

(d) container label - low temp, ethanol



# Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory**

(break, if needed)

## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory



## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory



Esteban Felix / AP

## (break, if needed)

### Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory



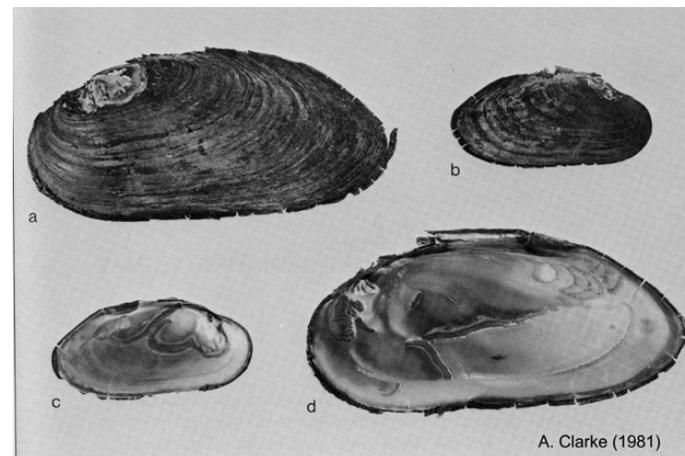
National Geographic

## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory

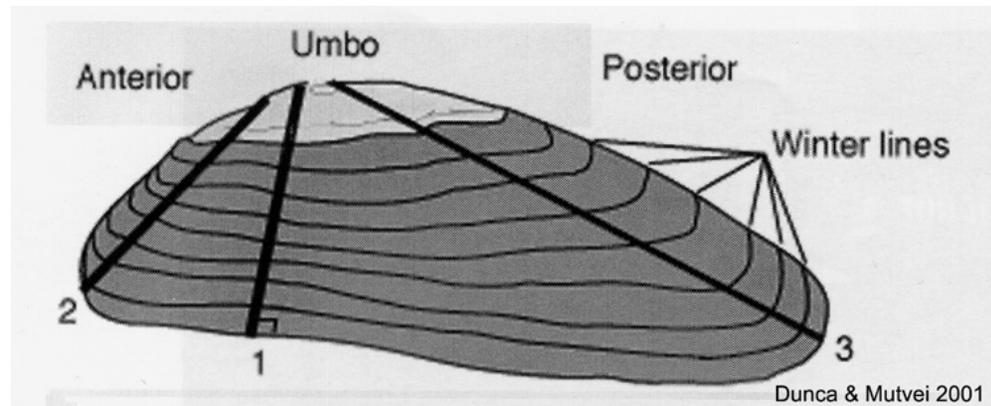


## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

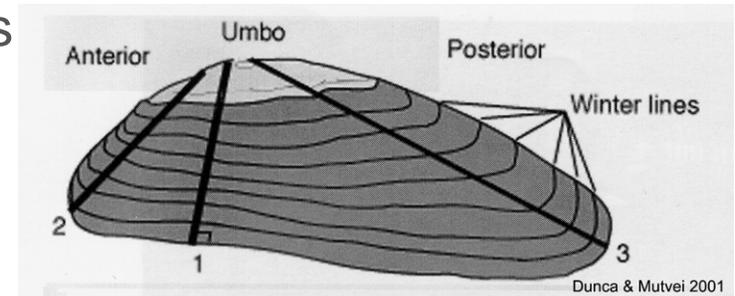
## Estimating mussel age

- aging techniques are estimates
- conchological characters-winter lines or growth rings



## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory



## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory



Cummings & Mayer 1991



Cummings & Mayer 1991

## Preserving mussel tissue

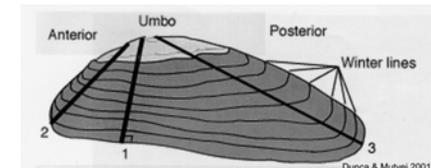
- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory



## Estimating mussel age

### (1) external valve characters

- clean valves to ease counting
- dark lines relatively easy to see
- erosion may erode early annuli
- annuli > 5 yr may be difficult to distinguish
- length and height frequently measured too
- stress - false annuli formation

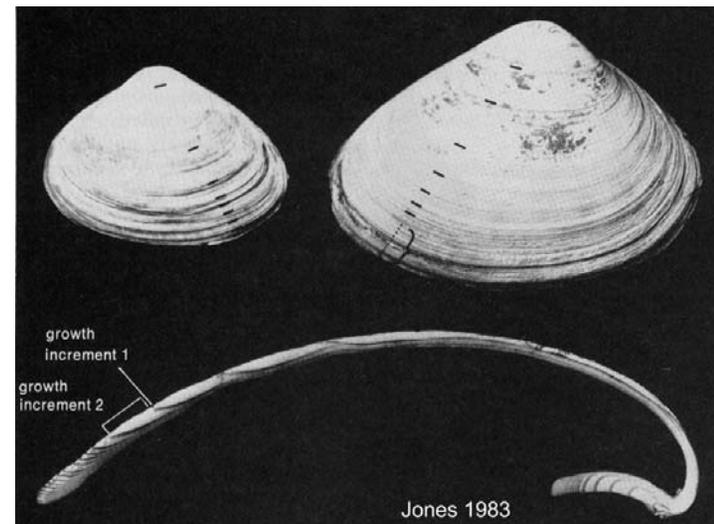


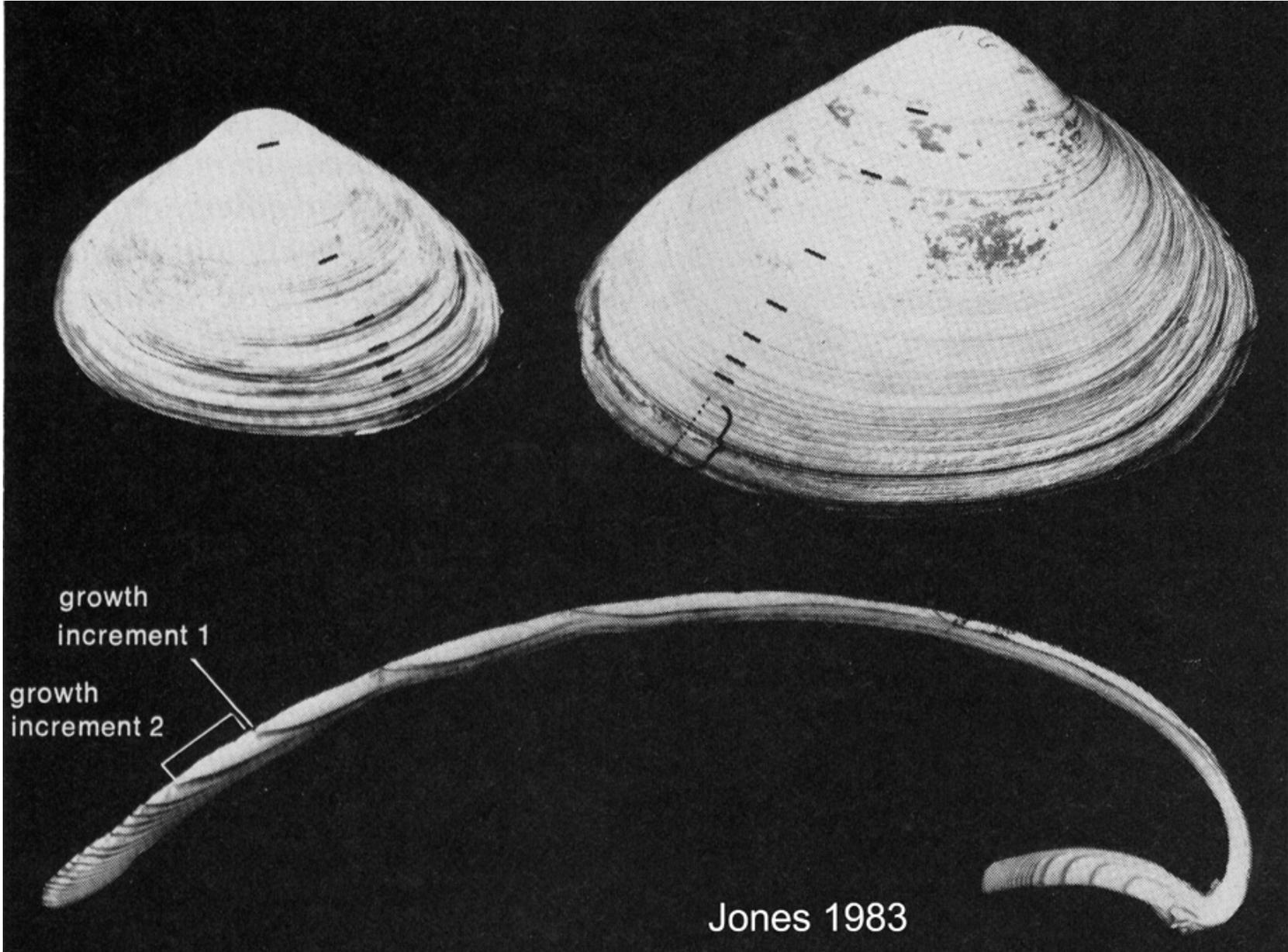
## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters**
- (3) laboratory





growth  
increment 1

growth  
increment 2

Jones 1983

## Preserving mussel tissue

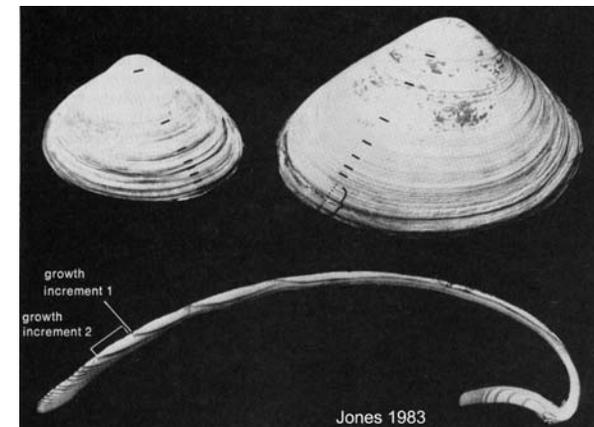
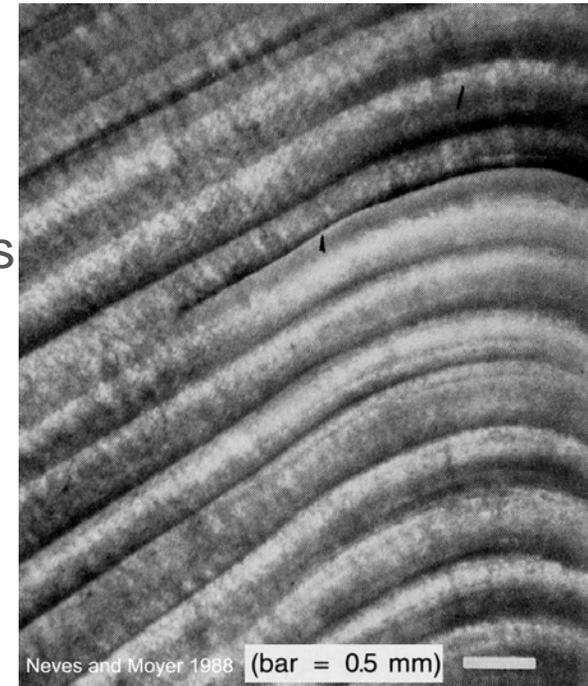
- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

## Estimating mussel age

(1) external valve characters

(2) internal valve characters

- stress lines easier to see
  - annuli extend to periostracum, stress lines fade as approach periostracum
- margin lines easier to see
- more time to generate estimate
- sacrifice animal or use empty valves



## Preserving mussel tissue

- (1) whole animals or valves-museums
- (2) tissue samples - genetic analysis
- (3) laboratory

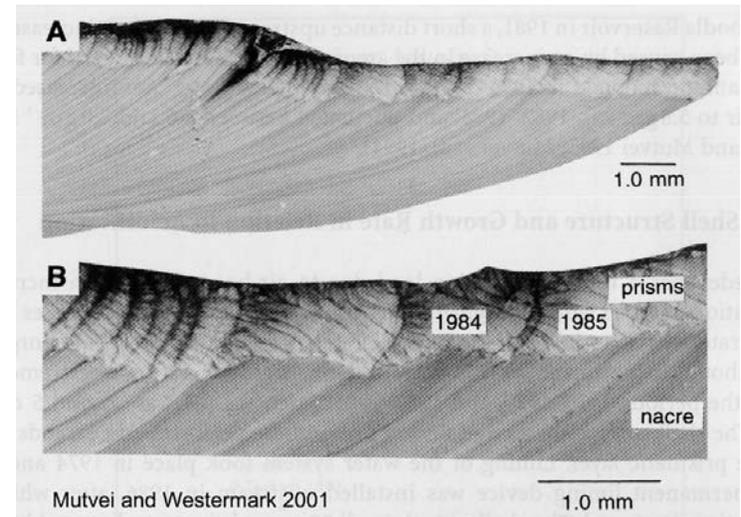
## Estimating mussel age

- (1) external valve characters

### (2) internal valve characters

#### Sectioning technique

- (a) jewelers saw to cut shell cross section
- (b) section valve to capture umbone peak
- (c) mount sectioned valve on glass slide
- (d) section again, approx. 1-2 mm thick
- (e) eroded valves - may be missing annuli



## Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

## Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory**



## Mussel identification

### Preserving mussel tissue

- (1) whole animals or valves - museums
- (2) tissue samples - genetic analysis
- (3) laboratory

### Estimating mussel age

- (1) external valve characters
- (2) internal valve characters
- (3) laboratory



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