



Isolating *Aeromonas* from Rainwater and the Atmosphere



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What is *Aeromonas*?

- An ubiquitous bacterium
- Known to portray many roles in the environment
- Disease-causing pathogen of fish, animals, and humans

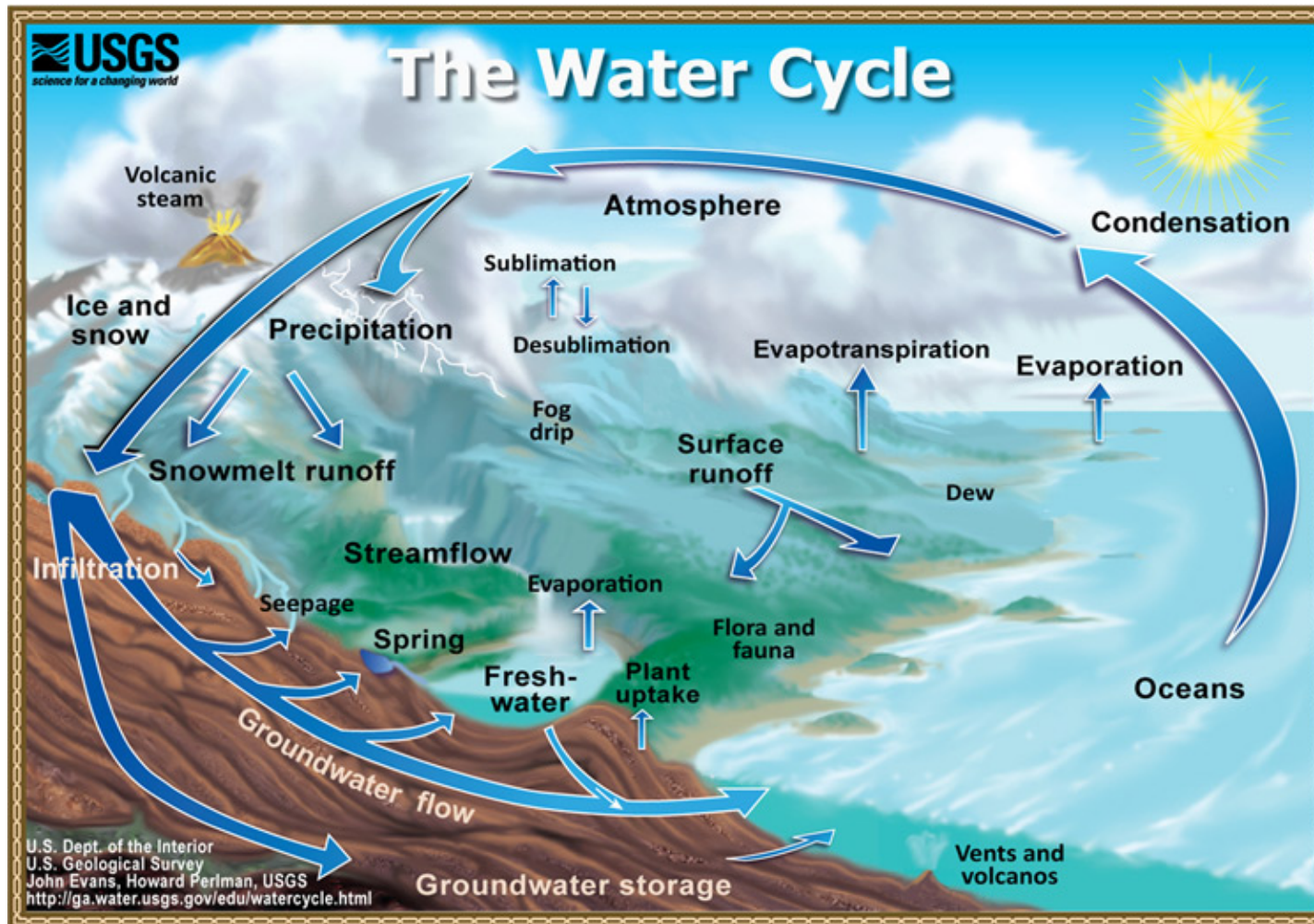


Figure 1 Fish infected with *Aeromonas hydrophila*. Registered under charity number SC000278
Heriot-Watt University is a Scottish charity UK

Aerobiology

- **Aerobiology**: the science dealing with the occurrence, transportation, and effects of airborne materials or microorganisms (as viruses, pollen, pollutants, or bacteria)
- Plays a fundamental role in transmission of infectious diseases (Fernstrom & Goldblatt, 2013).
- Occurs through “droplet” and “airborne” means
- Environmental factors influence airborne disease transmission

The Hydrologic Cycle

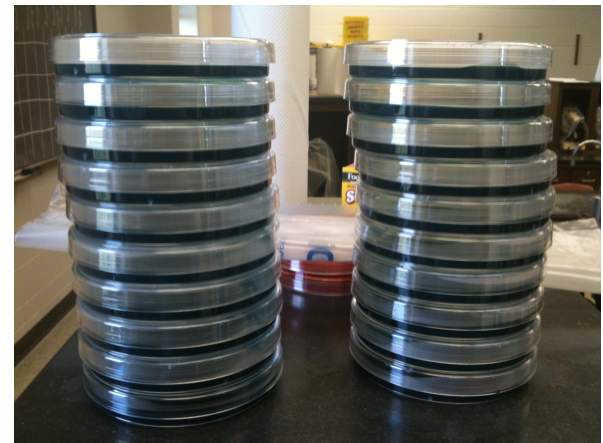
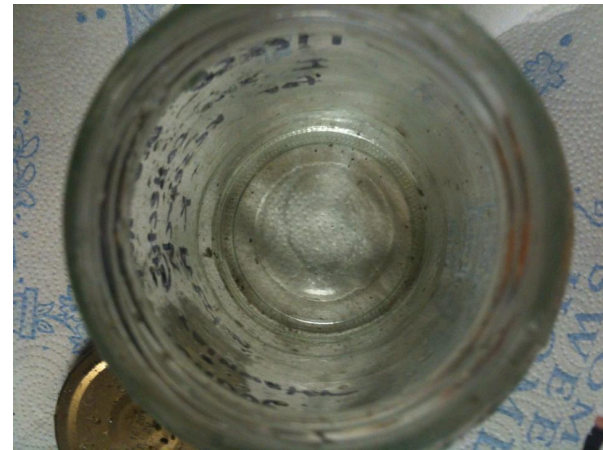


Significance of Study

- Water in the environment is a contamination route for microorganisms (Carvalho et al, 2012).
- Every year 1.8 million people die from diarrheal diseases attributed to unsafe water (WHO, 2004).
- *Aeromonas* associated with diarrheal diseases (Ahmed et al., 2012).
- *Aeromonas* causes gastroenteritis, skin and soft tissue infections and sepsis with lethal course (Khajanchi et al., 2010).
- Antibiotic resistance and virulence traits (Galindo et al., 2006).

Rainwater and Wind Collection

- Rainwater/Hail:
sterilized collection
jars
- Wind: *Aeromonas*
blue media plates



Subculturing and Isolating Colonies

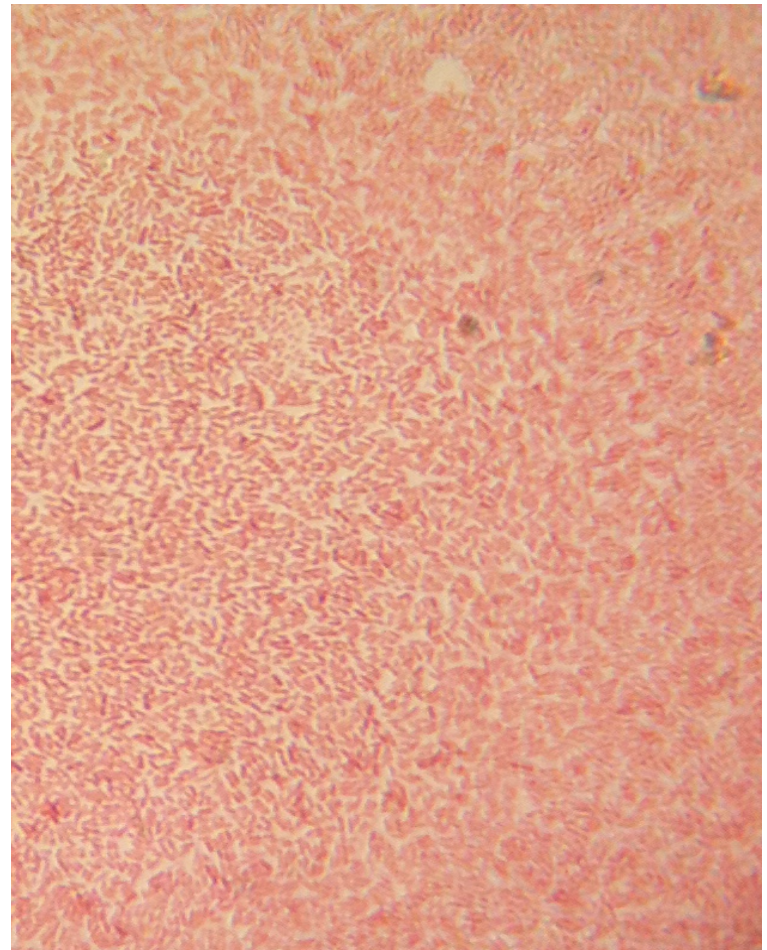
- Choose different individual colonies on plate
- Extract colonies and subculture by streaking onto TSA (Tryptic Soy Agar) plates
- Continued until pure colonies are isolated

Oxidase Test

- Specifically tests for certain cytochrome C oxidase
- Positive: dark blue to purple color
- Negative: no color
- Positive = possibility of *Aeromonas*

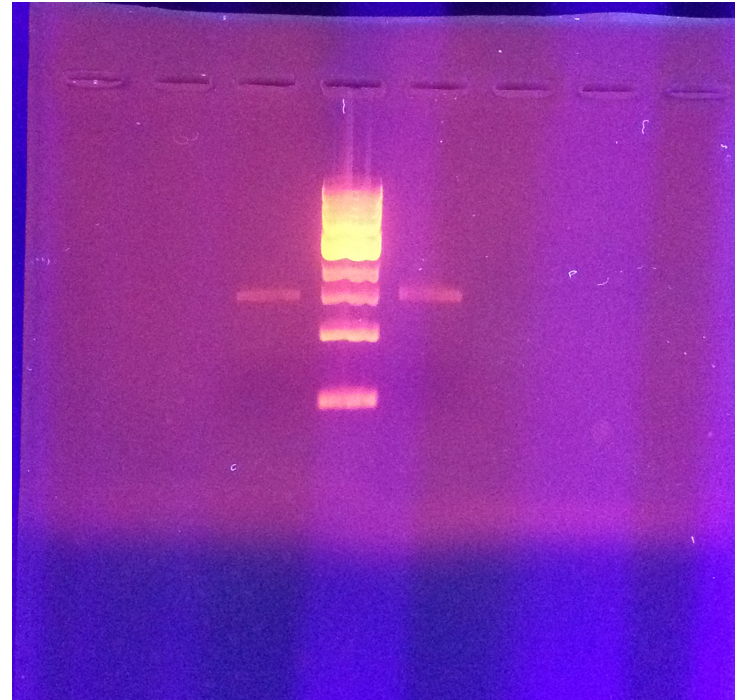
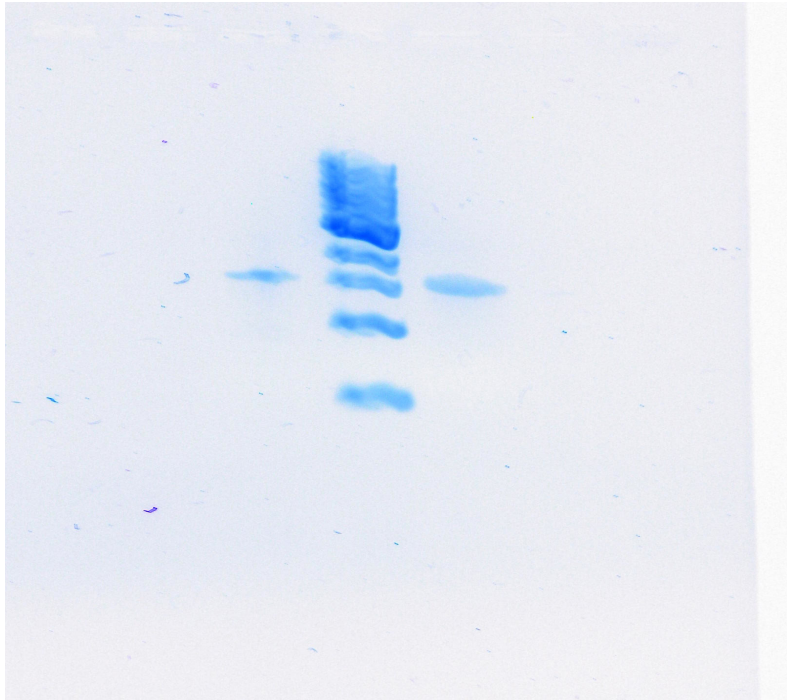
Gram Staining

- Used to view structure of isolated colonies
- Gram negative: pink
- Gram positive: dark purple
- Rods
- Cocci
- *Aeromonas*: gram negative rods



Colony PCR (Polymerase Chain Reaction)

- Determines presence of DNA
- Gel electrophoresis



Analysis of Results

- Collected rain water, hail and wind samples
- Plated and isolated colonies
- Performed oxidase tests and gram staining
- 10-15 possibilities of *Aeromonas*
- Ran colony PCR on possibilities

Limitations to Study

- Lack of rainwater
- Contamination

Potential Need for Further Study

- Further collection of samples
- DNA purification
- Sequencing of DNA

Application of Study

- Add to pool of research
- Heightened awareness of microbes in rainwater and atmosphere
- Impact on microbiology and everyday life

References: Literature

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References: Images

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