AQUATIC MACROINVERTEBRATE DRIFT DYNAMICS IN A FREESTONE STREAM IN THE ADIRONDACK PARK, New York

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CRANBERRY LAKE BIOLOGICAL STATION
CHAIR ROCK CREEK

- Medium sized freestone stream.
- Northeast corner of Five Ponds wilderness area
- Headwaters on Wolf Mt. at elevation of 3000 ft
- Flows into Cranberry Lake at Chair Rock Flow at elevation of 1900 ft.
- Pristine and rarely visited.
CHAIR ROCK CREEK SITES
CHAIR ROCK CREEK SITES CONTINUED
RESEARCH QUESTIONS

- Do areas with higher predator densities have increased rates of drift?

- At what time during the day are drift rates the highest?
BACKGROUND

- Increased invertebrate predator density has been shown to increase rates of drift among prey in a laboratory setting (Walton 1980).

- Predatory invertebrates may have more than twice the impact on prey densities as vertebrate predators (Wooster 1994).

- Drift is a common pattern of predator avoidance in many aquatic invertebrates.
Types of Drift

- Catastrophic
- Behavioral
- Density-Dependent
- Predator Induced
- Upstream
PREDATOR-PREY METHODOLOGY

- All samples taken using drift nets
  - Drift samples were allowed to soak for 24h period.
  - Benthic samples taken by disturbing bottom for 5 min. in the area 5 m upstream from the net.
  - Samples were sorted under magnification
  - Benthic samples and drift samples were compared to test hypotheses.
  - All habitat types accounted for.
NICHE PARTITIONING

Organisms subdivide resources within a habitat.
THE PREDATORS
THE PREDATORS (CONTINUED)
THE PREY
PREDATOR-PREY RESULTS

**Baetis Drift**

![Graph of Baetis Drift]

**Stenonema Drift**

![Graph of Stenonema Drift]

Note: scale of graphs differ
RESULTS CONTINUED

Leuctra Drift

Stenelmis Drift

Drift Percentage

Predator Density

(# predators/m2/individual)

Drift Percentage

Predator Density

(# predators/m2/individual)
RESULTS CONTINUED

Overall Drift

Chironomidae Drift

Drift Percentage

Predator Density (#predators/m²/individual)

Drift Percentage

Predator Density (#predators/m²/individual)
**Predator-Prey Discussion**

- A clear link between predator density and drift was not established.
- Drift is most likely dependent on numerous variables.
- Our experimental design may not have detected discrete periods of increased drift when predators are most active.
- Certain taxa exhibited higher rates of drift.
- Midges are important component of drift.
PEAK DRIFT

- At what time during the day are drift rates the highest?
BACKGROUND

- Previous studies have shown that drift rate increases at night during the summer (Benke et al. 1986).
- Drift may not follow this pattern during winter.
  - Decreased light
  - Predators have slowed metabolism
- This is most likely due to predator avoidance.
- Early instars may have higher rates of drift during the day due to their small size.
METHODOLOGY

- Drift nets set for 24 hours.
  - Set in three dominant habitat types.
  - Emptied every three hours.
  - Samples sorted under magnification.
PEAK DRIFT RESULTS

Number of individuals collected vs Time of day. The graph shows a peak at around 18:00, indicating the highest drift at that time. The scale is set at 6, corresponding to 6 AM.
RESULTS CONTINUED

The graph shows the number of individuals collected over the course of the day, with the highest number collected around the 15th hour of the day.
RESULTS CONTINUED

Time of day vs. Number of Individuals Collected
RESULTS CONTINUED

![Graph showing the number of individuals collected over time of day]

- **# individuals collected**
- **Time of day**

The graph illustrates the variation in the number of individuals collected throughout the day, with peaks observed at certain times and troughs at others.
DISCUSSION OF PEAK DRIFT

- A period of increased drift occurred from around 9 pm to 3am.

- Drift peaked between 9 pm and midnight.

- Drift rates may not vary as much on overcast days.
  - Drift may be light dependent as opposed to night dependent.
QUESTIONS?
WORKS CITED

- Benke, Arthur, Hunter, Robert, and Fred Parrish. Invertebrate drift dynamics in a subtropical blackwater river. NABS. 5:173-190

- Photo Credits: Jason Neu