Fluid mechanics of feeding determine the trophic niche of the hydromedusa *Clytia gregaria*

Marco Corrales-Ugalde & Kelly Sutherland
Oregon Institute of Marine Biology, University of Oregon

-Background

Current feeding predators generate fluid mechanical disturbances. These disturbances can be detected by rheotactic (flow-sensing) prey when they enter the predator's encounter zone (Colin et al. 2010).

The swimming cycle of the hydromedusa *Clytia gregaria* alternates between **active current-feeding** and **passive sinking** (Mills 1981).

Fluid motion during the swimming cycle likely determines *C. gregaria*'s trophic niche, **but the interaction between current feeding predators and their prey is poorly studied.**

A new framework to analyze the predation process is required to account for early detection of the predator by the prey.

-Questions

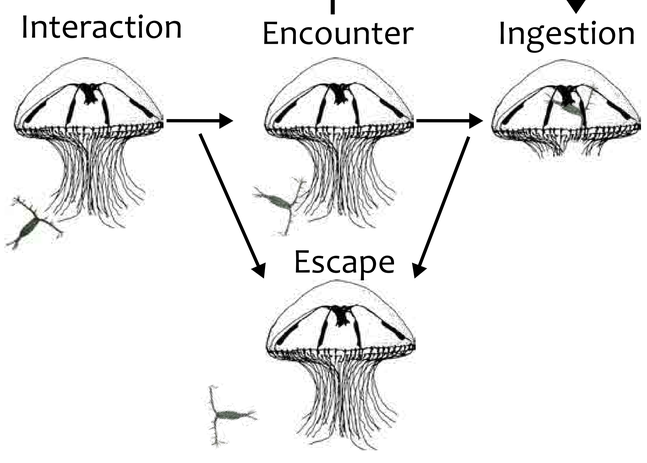
1. Does the swimming behavior of *C. gregaria* affect the outcome of the predation process of different prey types?

2. Can the fluid deformation rates produced by *C. gregaria*'s feeding behavior be perceived by rheotactic prey?

-Methods

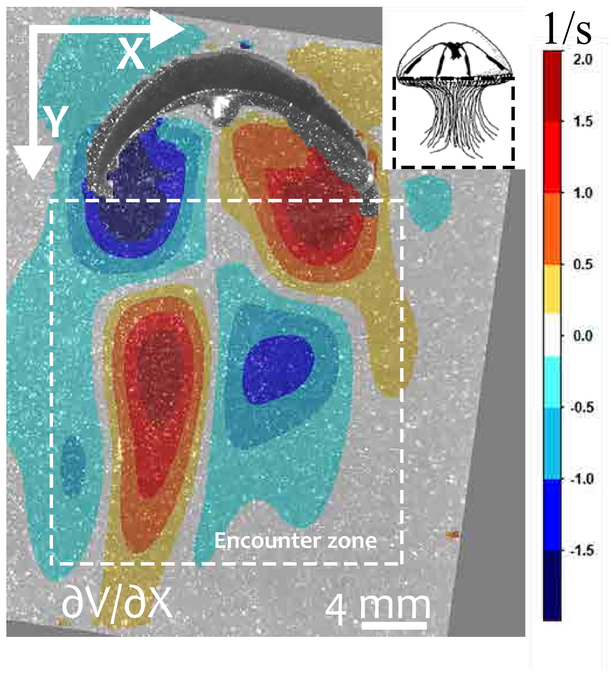
1. **Percentage of ingestions (ingestions/total interactions) x 100**

Ingestion efficiency *(ingestions/encounters) x 100*



2-D bright-field videos of the starved jellyfish feeding on a natural prey assemblage to quantify the efficiency of the predation process

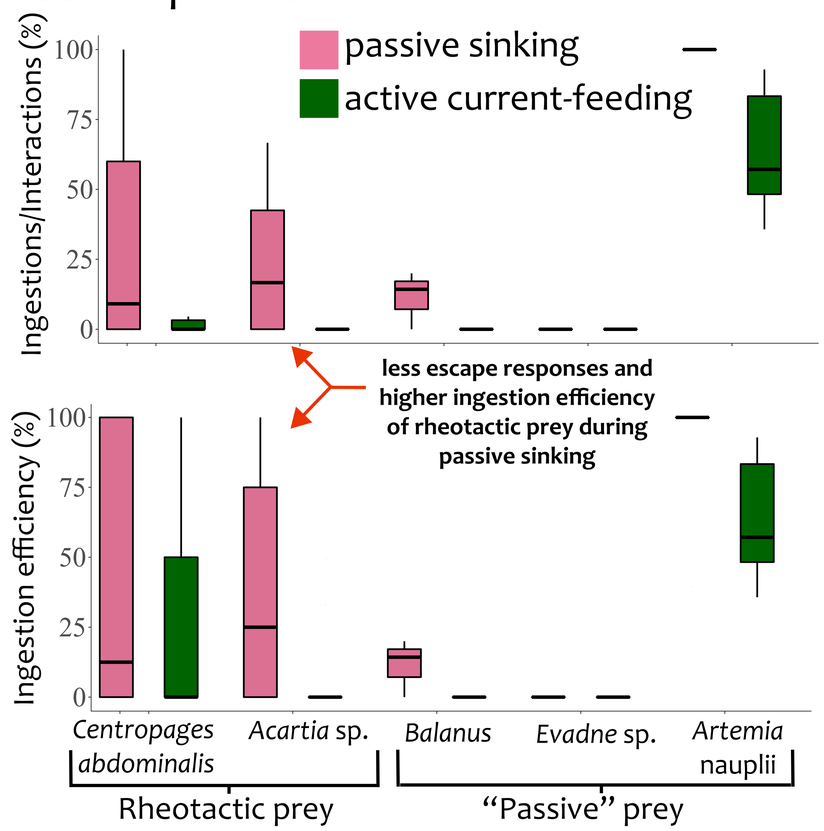
2.



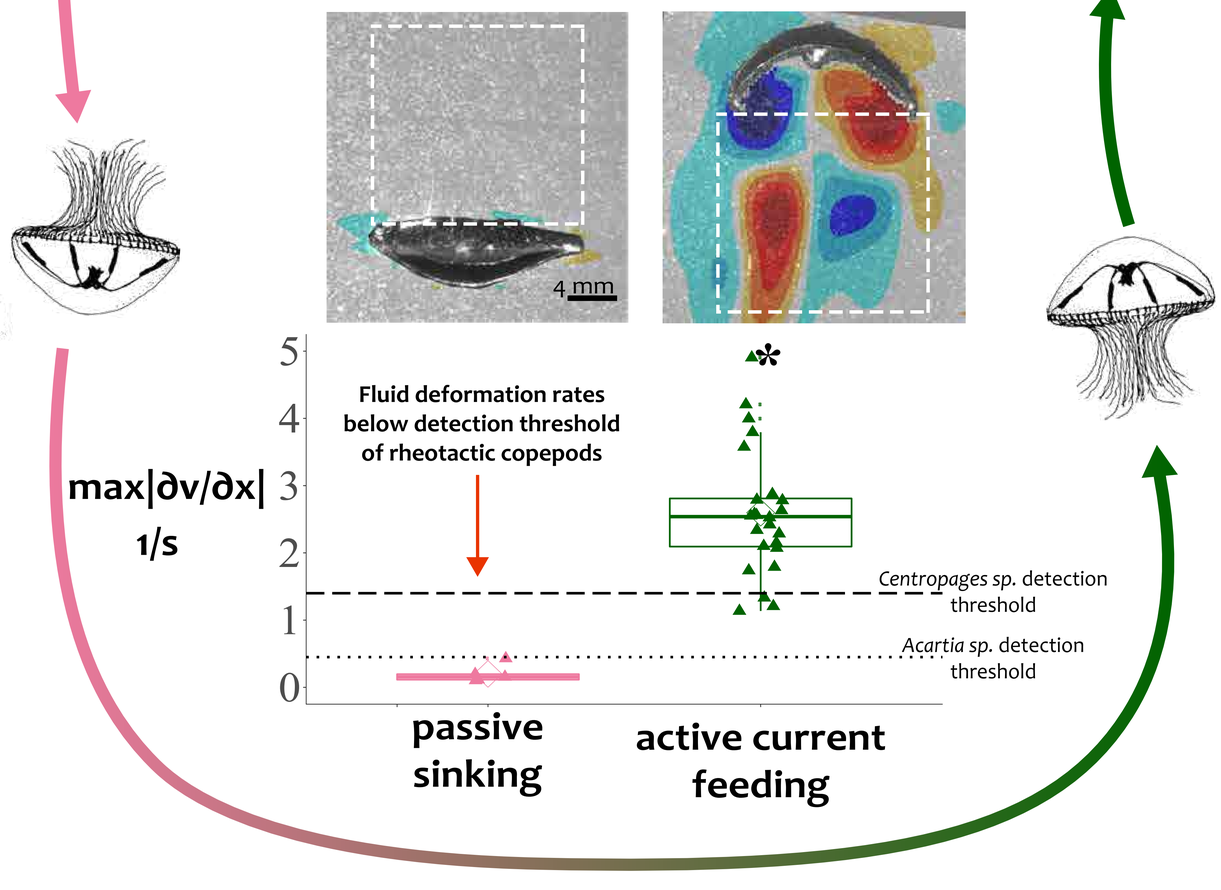
2-D Particle Image Velocimetry videos to quantify the fluid deformation rate inside the jellyfish's encounter zone

-Results

1. Predation process



2.Fluid deformation rates



-Conclusions

- Decrease in fluid deformation rates during passive sinking allows *C. gregaria* to feed on multiple prey
- Higher ingestion efficiency during passive sinking suggest high prey clearance rates for *C. gregaria*.
- Predator- induced fluid motion is likely a trait that defines the trophic niche of gelatinous predators.

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S. Colin, J. Costello, B. Gemmell, G. Gerbi, J. Masterman, J. Lyle, D. Librie

-References

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