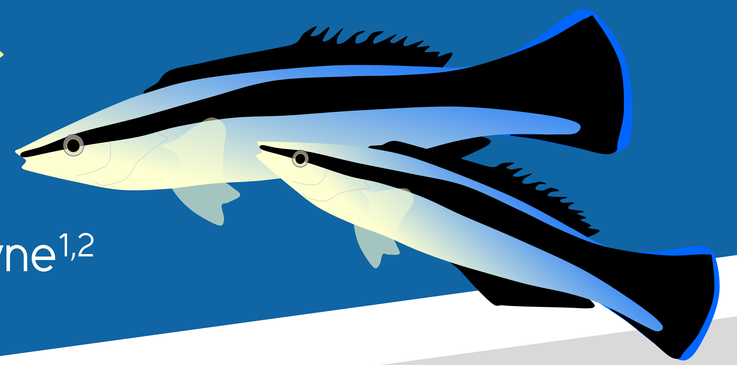
# The effects of tank type on the spawning behavior of the cleaner wrasse *Labroides dimidiatus*



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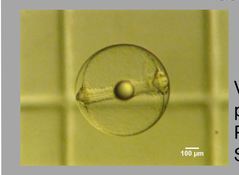
## Introduction

- *Labroides dimidiatus* is the 14th most common marine aquarium fish imported into the U.S.
- Provides ecosystem services on reefs as fish cleaners.
- Removal of *L. dimidiatus* decreases reef fish diversity and increases fish ectoparasite loads.
- Commercial-scale captive production will reduce collection pressures and increase reef health.
- Goal: determine optimal aquaculture-friendly conditions for the spawning of *L. dimidiatus* .

*L. dimidiatus* cleaning client. Photo credit: Klaus Stiefel, Flickr

## Methods

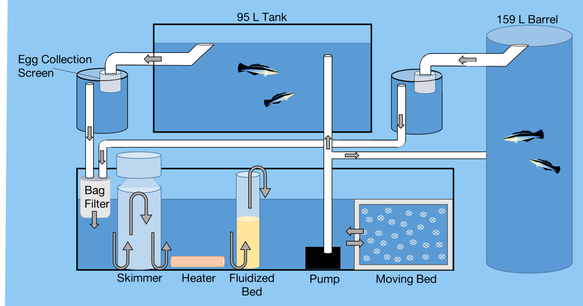
- Seven bonded pairs of *L. dimidiatus*
- 833 L recirculating saltwater system
  - 4x 95 L glass aquaria (52 cm tall)
  - 4x 159 L round plastic barrels (103 cm tall)
- Outflow of tanks designed to drain water from the upper water column to collect floating eggs.
  - Eggs collected via 105 µm mesh screen.
- Eggs were collected nightly at 8 pm.
  - Sterilized using 1 ppm iodine bath for 5 min.
  - Stored overnight with light aeration.
- Spawns analyzed 12 hr post-collection.
  - Eggs enumerated
  - Subsample (n=30) photographed for viability.
    - Presence of neurula stage larvae




Viable egg 12-18 hours post-spawn. Note the presence of neurula stage of development. Photo credit: Joseph Szczebak

## Results

### Broodstock System

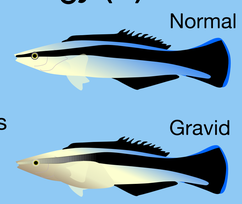


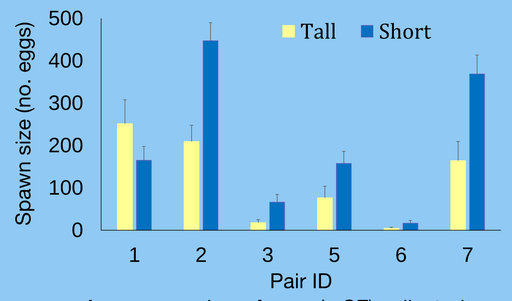

### Broodstock Diet

| Time | Feed Type |
|---|---|
| 0800 | LRS Fertility Frenzy |
| 0900 | Frozen Mysis |
| 1000 | Frozen Copepods |
| 1100 | LRS Fertility Frenzy |
| 1300 | Frozen Mysis |
| 1400 | LRS Fertility Frenzy |
| 1500 | Frozen Copepods |

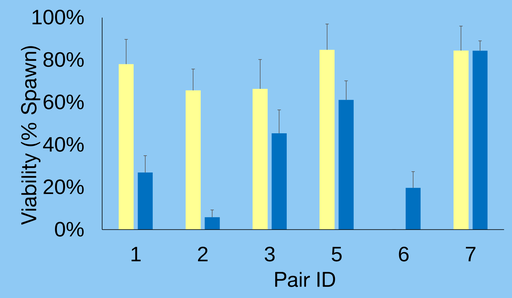
### Spawning Morphology (♀)

- Head darkens
- Eyes lighten
- Stripe over eye fades
- Abdomen swells




Average number of eggs (± SE) collected over 28 nights per treatment.




Average percent viability of floating eggs (± SE) collected over 28 nights per treatment.

### Courtship/Spawning Behavior

- Repeated small ascents
- Female approaches male in “S” shape
- During spawning ascent, pair spirals, breaks surface of water, and releases eggs and sperm

## Conclusion

- Although there was some effect of tank size, this result seemed to be a pair effect.
  - Tank type did seem to have an effect on spawn size and viability for some pairs, there was high variability within and across pairs.
  - Inconsistencies suggest environment within each tank type was not ideal.
- Neither size tank used in the experiment was optimal for successful commercial spawning efforts.

*L. dimidiatus* in situ. Note indicators of spawning, most notably including slightly swollen abdomen. Photo credit: Brian Gratwicke, Flickr

## Next Steps

- We plan to determine the effects of the below parameters on spawn size and viability:
- Larger tank sizes
- Tank community
  - Reef tank vs bare tank
  - Isolated pairs vs tank mates (e.g. client fishes)
- Wrasse social structure
  - Pairs vs harems

## References

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Grutter, A. S. (2012). Enhanced colonization success and competition associated with conspecifics in cleaner fish Labroides dimidiatus juveniles. *Coral reefs*, *31*(4), 1169-1176.

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