

INVESTIGATING WHICH
SALINITY LEVEL IS
BEST FOR COPEPOD
SURVIVAL AND
PRODUCTION

Richard Lacson

Kagman High School

Mentor

Micheal M. Ogo

Norther Marianas College

Coordinating Center

University of Hawaii at Manoa



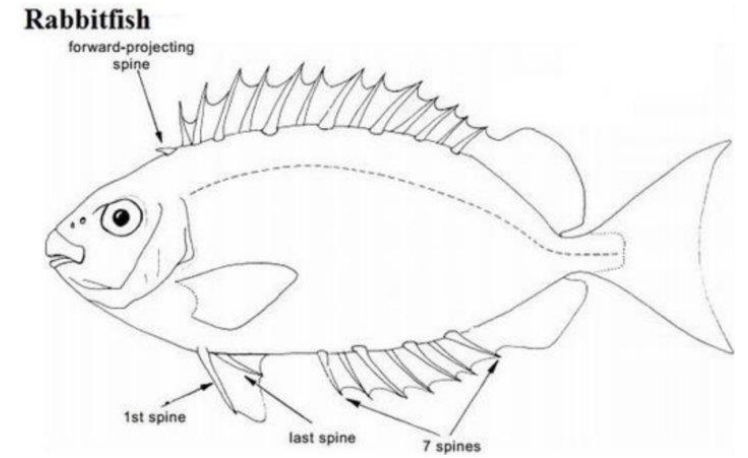
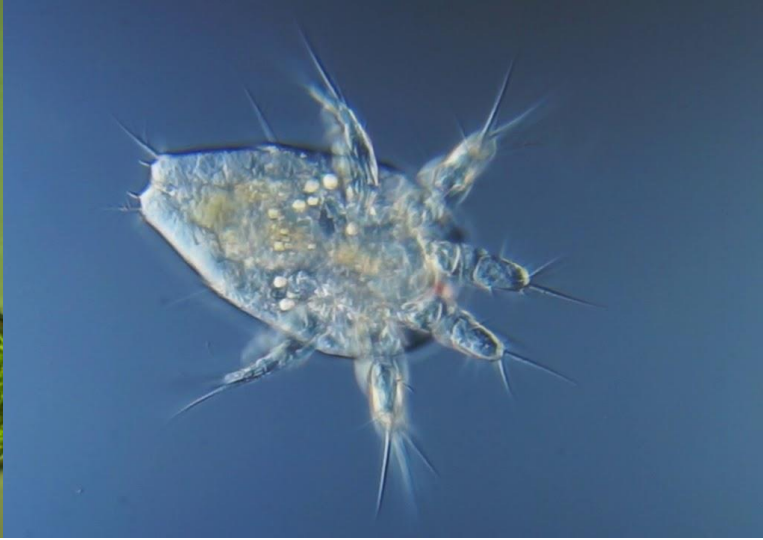
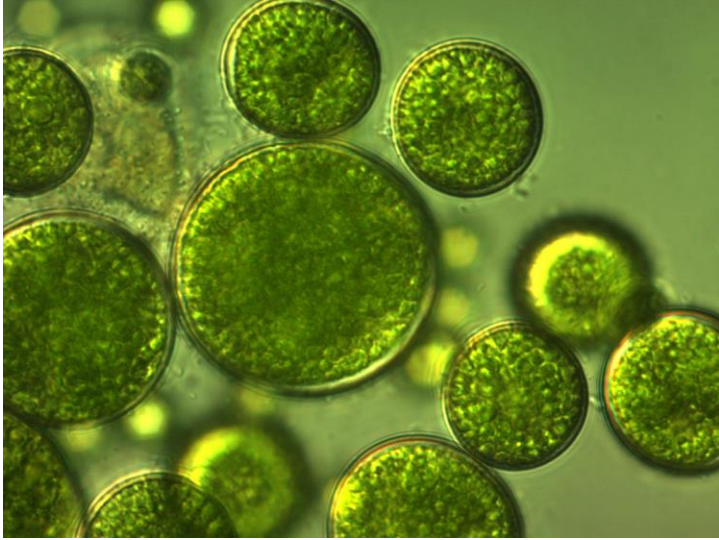
BACKGROUND INFORMATION

Genus: Apocyclops

Species: Panamensis

Size: 0.1 - 0.4 mm

Apocyclops panamensis copepod are crustaceans found in both bodies of saltwater and freshwater. Their primary source of food is microalgae and copepods are the base of the marine food chain. Copepods are consumed by many small fish larvae (rabbit fish) after their yolk, as their first source of food making them a very important component in the food chain. In aquaculture copepods are critical to the process of larval rearing. Aquaculture facilities use copepods as feed to freshly hatched larvae until they are mature enough to eat other sources of food.



Rabbitfish

RESEARCH QUESTIONS

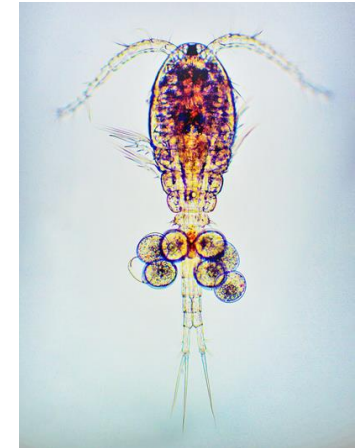
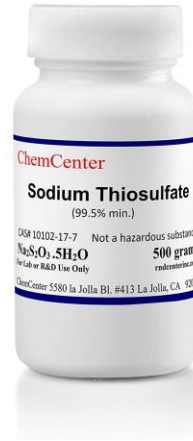
- Which water salinity level is best for copepod growth and reproduction?
- How do copepods nauplii react to differing salinity levels?

HYPOTHESIS

Based on prior research I hypothesize that copepod survival will be best at 20 salinity.

MATERIALS

- 2-liter water bottles
- Fresh Water
- Salt water
- Bleach
- Thiosulfate
- Apocyclops Copepods
- Rigid Air Tube
- Scale



MATERIALS

- Microscope
- Sedgwick rafter
- Frozen Microalgae Rotigrow
- Air Pump
- Air Tubes
- RefractoMeter
- Aqua Check Strips



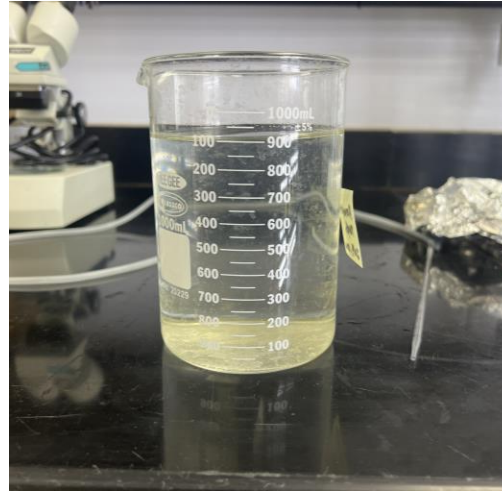
METHODS

- Set up the air pumps and connect them to the rigid air tube
- Drill a hole in the bottle caps of the water bottles
- Disinfect water bottles in a Clorox bath
- Mix 3 different ratios of saltwater and freshwater (15, 20, 25)
- Add four milliliters of bleach to each bottle



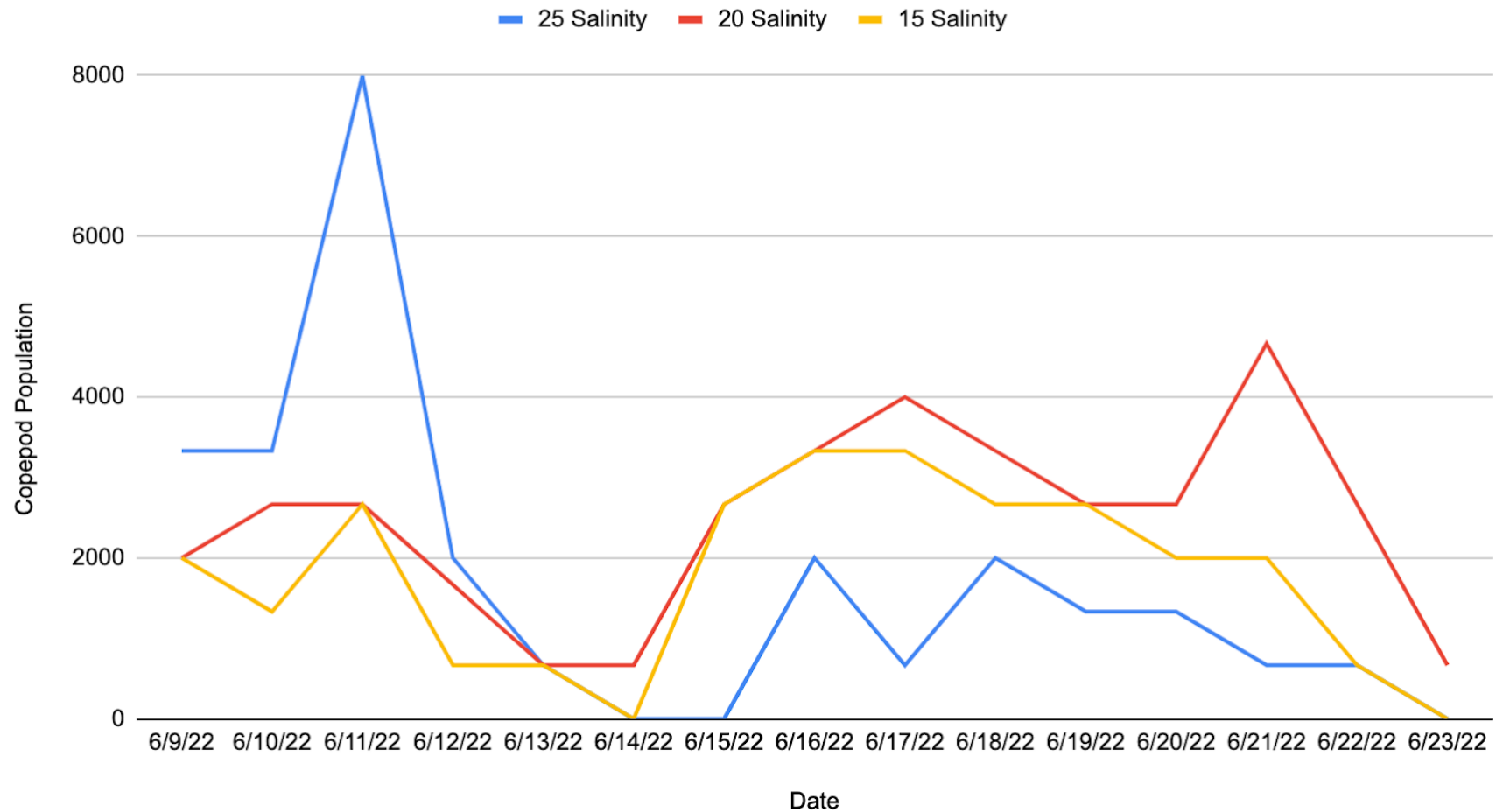
METHODS

- After thirty mins neutralize the chlorine by adding thiosulfate
- Add 2-3 copepods per ml (4000-6000 copepods) into each bottle
- Connect the rigid air tube to the caps
- Draw 1 milliliter samples from each bottle and count daily



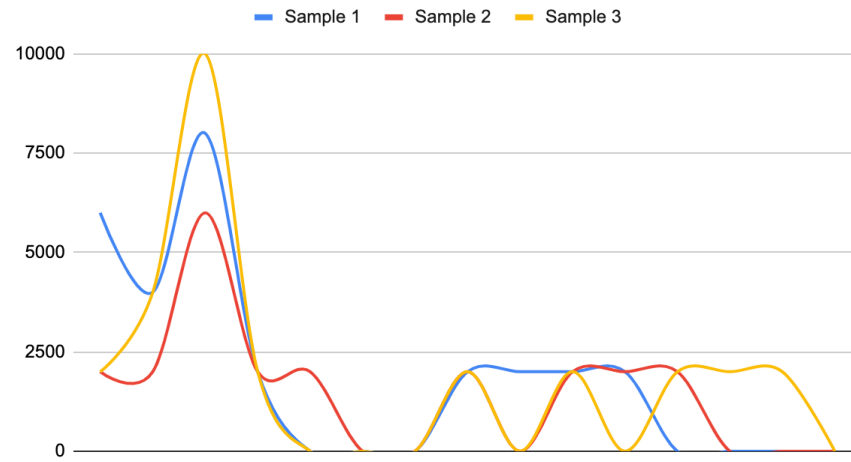
RESULTS

Average Copepod Population

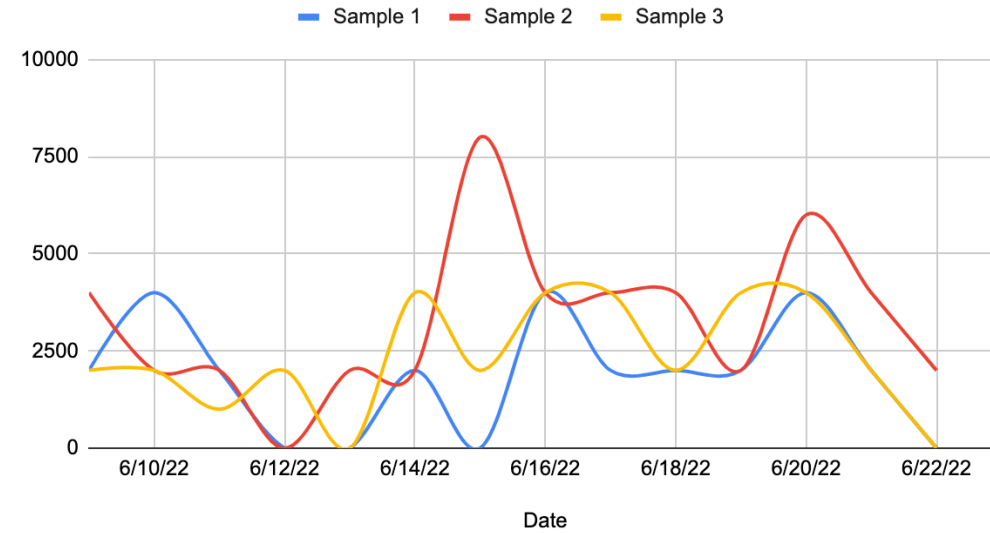


RESULTS

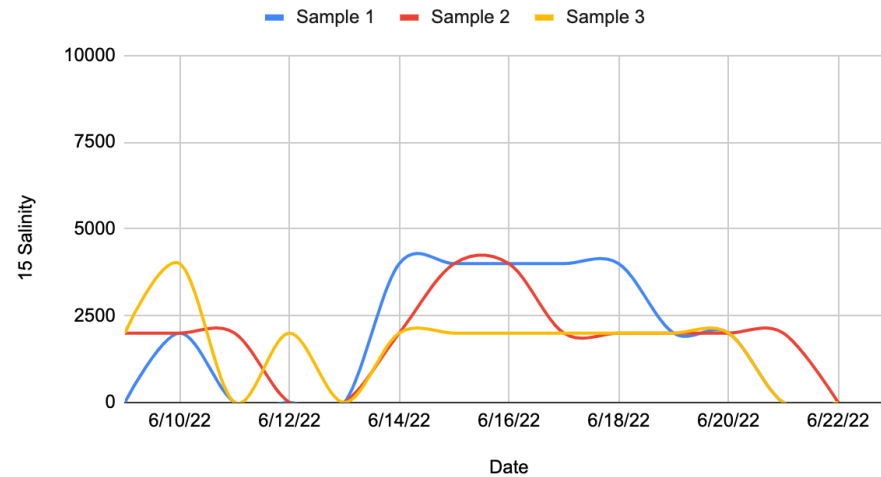
Copepod Population (25 Sal)



Copepod Population (20 Sal)



Copepod Population (15 Sal)



OBSERVATIONS

By the fourth day, copepod populations dropped in all three salinity levels but rose two days after initial drop.

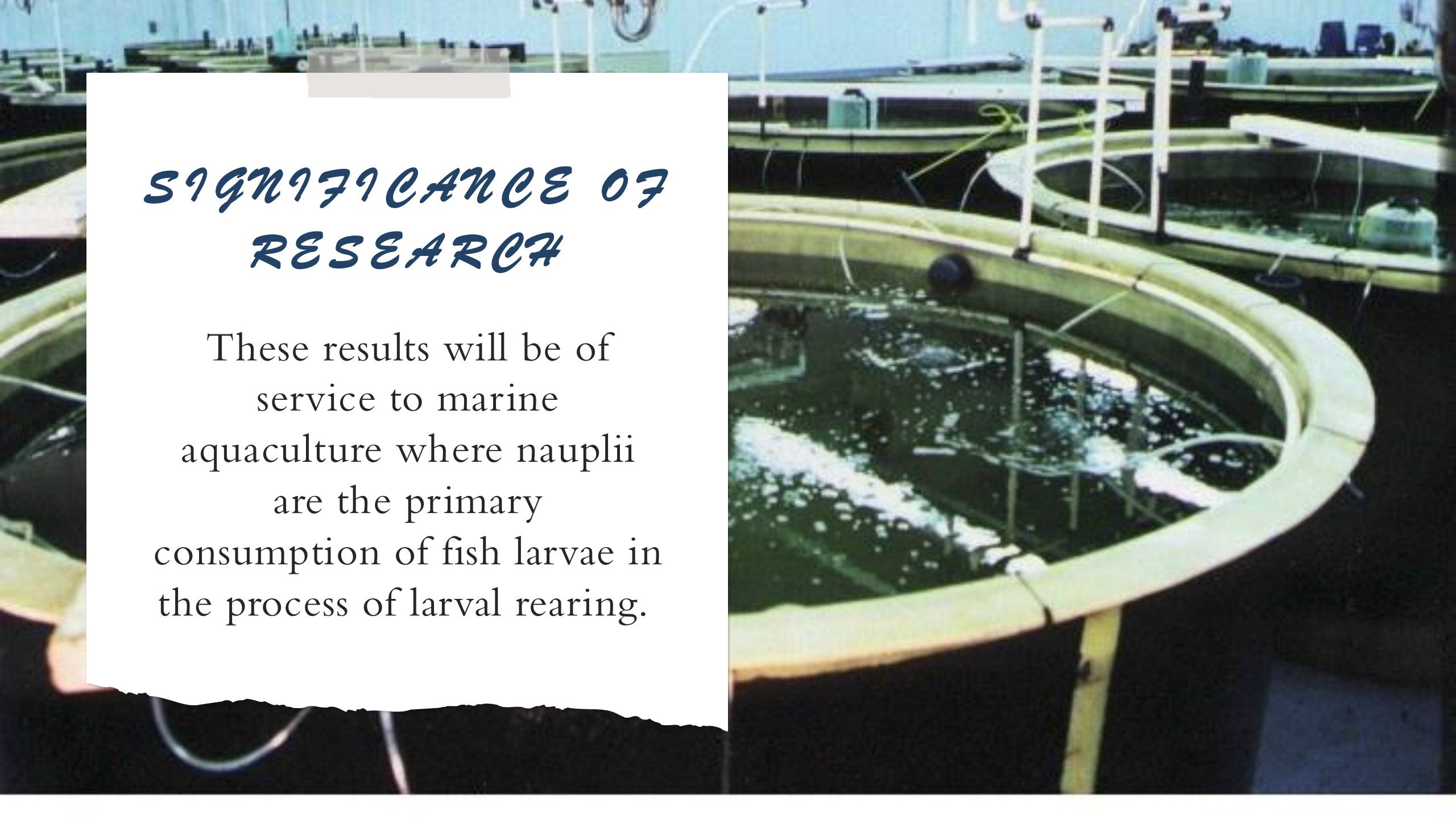
By the 6th day, most nauplii matured into copepodites.

By the end of the experiment almost all copepods died.

No copepods in this experiment reproduced.

Conclusion

Based on the results of the experiment, water salinity at 20% is best for copepod survival, followed by 15% and lastly 25%.



SIGNIFICANCE OF RESEARCH

These results will be of service to marine aquaculture where nauplii are the primary consumption of fish larvae in the process of larval rearing.

ADDITIONAL RESEARCH

Duplicate research in a warmer environment to investigate difference in copepod activity using the same salinity levels.

ACKNOWLEDGEMENTS

Northern Marianas College - Cooperative Research,
Extension, and Education Services (CREES)

Mr. Mike Ogo

Mr. Rovien Maritita

Ms. Victoria Buniag

STEP-Up Program

Dr George Hui

Ms. Aneesa Golshan

The STEP-UP HS program is supported by the National
Institutes of Diabetes and Digestive and Kidney Diseases
of the National Institutes of Health, Grant number:
R25DK78386-16.

CNMI Public School System

Mr. Asapmar Ogumoro



REFERENCES

Pan, Yen-Ju. “Effects of Salinity on the Reproductive Performance of Apocyclops Royi (Copepoda, Cyclopoida).” *Journal of Experimental Marine Biology and Ecology*, Elsevier, 6 Dec. 2015,
<https://www.sciencedirect.com/science/article/abs/pii/S0022098115300617>.

Cruz-Rosado, Leonardo. “Population Growth of a Generational Cohort of the Copepod Apocyclops Panamensis (Marsh, 1913) under Different Temperatures and Salinities.” *Ecosistemas y Recursos Agropecuarios*, Universidad Juárez Autónoma De Tabasco, Dirección De Investigación y Posgrado,
http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-90282020000200105.