Heliocidaris in Victoria

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Port Phillip Bay (PPB)

- Over abundance of sea urchins (*Heliocidaris erythrogramma*)
- Resulted in vast areas of the bay covered by urchin barrens instead of kelp beds
- Restoration?
Roe in urchins from barrens
Roe enhancement aquaculture
After enhancement
Bottleneck issues to solve

1) **Urchin collection.** Can urchins be easily collected while ensuring a high survival rate and optimal condition for roe enhancement of *H. erythrogramma*?

2) **Maximising gonad quantity (%GI).** What is the optimal base feed for roe enhancing *H. erythrogramma*?

3) **Optimising gonad quality.** What feed supplements are effective to optimise roe quality of *H. erythrogramma*?
1) Collection from barrens
1) Collection from barrens

**Optimal method:**
- A diver on scuba with catch bags and a garden hook can select pick ~400 urchins per hour

- Transported in seawater aerated with pure Oxygen

- 98% survival rate

Bottleneck issues to solve

1) **Urchin collection.** Can urchins be easily collected while ensuring a high survival rate and optimal condition for roe enhancement of *H. erythrogramma*? **Yes**

2) **Maximising gonad quantity (%GI).** What is the optimal base feed for roe enhancing *H. erythrogramma*?

3) **Optimising gonad quality.** What feed supplements are effective to optimise roe quality of *H. erythrogramma*?
2) Maximising gonad quantity (%GI)

- Produced pelleted feeds (Nutrition and Seafood Laboratory (NuSea.Lab))
- Tested 18 feed types with varying amounts of protein, lipid and carbohydrate content
- To determine an suitable base feed for *H. erythrogramma*
2) April – July (%GI)
2) July – October (%GI)
Bottleneck issues to solve

1) **Urchin collection.** Can urchins be easily collected while ensuring a high survival rate and optimal condition for roe enhancement of *H. erythrogramma*? Yes

2) **Maximising gonad quantity (%GI).** What is the optimal base feed for roe enhancing *H. erythrogramma*? Yes

3) **Optimising gonad quality.** What feed supplements are effective to optimise roe quality of *H. erythrogramma*?
3) Optimising gonad quality

• Use the 2017 optimal pelleted feed (Nutrition and Seafood Laboratory (NuSea.Lab))

• Add a range of supplements to the feed (e.g. specific seaweed species)

• To improve grade distribution and taste *H. erythrogramma*
3) Grade distribution

- Use the 2017 optimal pelleted feed
3) Consistent colour and texture
3) Consumer taste testing

Figure 1. Consumer taste preferences of roe from the purple sea urchin fed different finishing diets. Error bars = ± 1 SE.
Summary

1) Divers select pick urchins at ~ 400 urchins per hour with 98% survival

2) Roe enhance to >20% GI in 12 weeks

3) Produce roe with good colour and taste

Next step – Can this be done on a larger scale?