The Shore Clingfish

Introduction

Over the April-July period as a Long-Term Volunteer, I undertook my personal project on the shore clingfish (*Lepadogaster lepadogaster*), a species that have never been studied on Skomer before. The shore clingfish is a small cryptobenthic organism that is abundant across the West and South West coasts of the United Kingdom. It is immediately recognisable from its duck-like mouth and two blue spots on the top of its head. They have specially adapted pelvic fins that have fused to form a sucker which anchors the fish to the rocks it inhabits.

Figure 1. Shore clingfish with visible blue head markings (*orcelli*)

Aims

I wanted to find out more about the life history traits of the clingfish with a focus on seasonality and their breeding cycle. Specifically, I wanted to know: (a) the zonation of clingfish across the shore, (b) whether the proportion of fish changed over a nine-week period, (c) document the developmental stages of egg clusters to monitor whether there was a noticeable change and, (d) record the egg developmental rate.

Methods

I had two transects on North Haven beach, at the lower and middle shore shore. I initially located these transects using a 1 m high tidal staff (which I made using old fence posts and a spirit level!). I then would lay a 30 m transect from the same start and end point in the spring tides (when the tides move the most). I carefully overturned and replaced every rock of a certain size to look for clingfish and eggs. Once eggs were found, a unique marking was given so I could re-find the rock on future visits. An aquarium was also created to house two rocks with eggs so their development could be monitored more closely.

Results

On all visits, no clingfish or egg clusters were found in the middle shore transect. The first clingfish was seen out of my visits on a preliminary sample on the 9th April and the first eggs on 23rd April. The proportion of adults was higher than eggs (Figure 2), the average proportion was 0.83 clingfish to 0.17 total egg clusters. The third and sixth visit showed the highest number of new eggs of 11 and 12. The highest number of total egg clusters was found on one visit, with 15 in total (Figure 3).

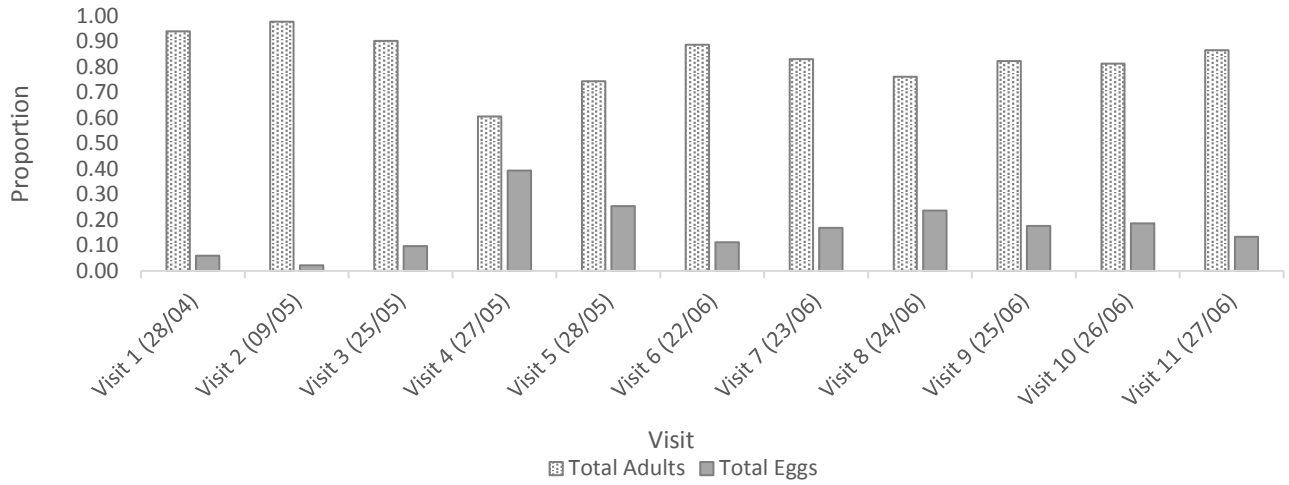

Figure 2. Proportion of adults to eggs seen over the 11 visits to the lower shore transects. Proportion of adults higher than the proportion of total eggs found. Total number of eggs does not account for eggs that may have hatched, been predated or lost.

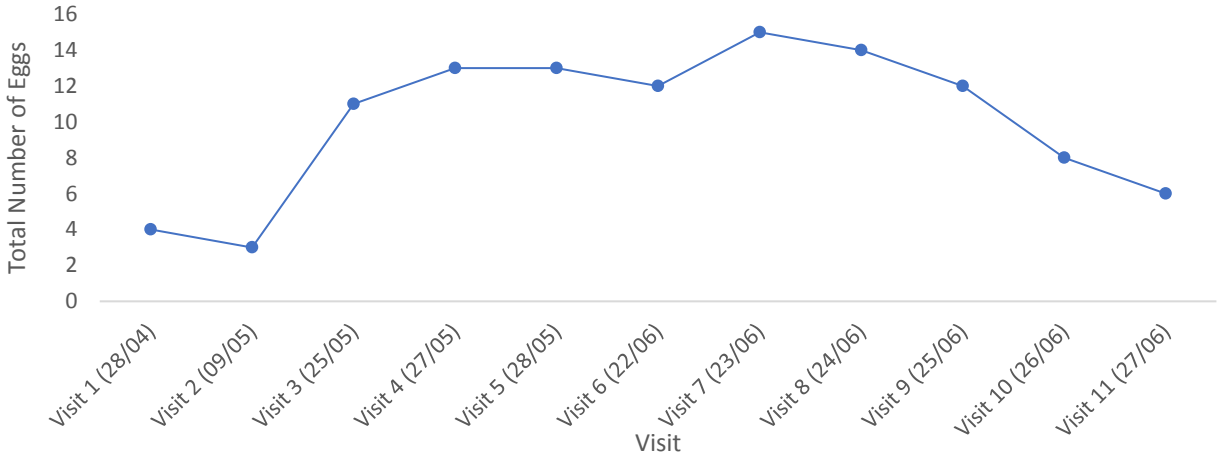

Figure 3. Cumulative number of total eggs per visit. Highest number of total eggs found on the seventh visit. The total number of eggs does not account for eggs that may have hatched, been predated or lost.

The eggs did not cope well in a lab environment, making it difficult to provide an estimate of hatch duration, however clear developmental stages were seen in the lab and field. From observations, it is thought that there are four visual changes to the eggs before they hatch (Figure 4). At a rough estimate, I would say the eggs take 12 days to develop and hatch.

Figure 4. Stages of development in different egg clusters. (a) stage 1 (b) stages 1 and 2 (c) stages 1 (bottom), 2 (top), 3 (around the darker circle in the centre) and 4 (dark circle in centre) (d) stages 1 and 3 (e) stage 3 (f) stages 3 and 4 (top right) and above eggs that have hatched

Presumed stages are as follows:

- Stage 1 – Yellow – freshly laid eggs. Often a small dot can be seen encased.
- Stage 2 – Orange/golden – Before the fish start to develop and form recognisable characteristics.
- Stage 3 – Orange, development beginning. Eggs have an orange hue but eyes are clearly visible and may be seen moving around inside the casing.
- Stage 4 - Dark grey, developed, ready to hatch. By this stage, the eggs seem to lose their colour and appear dark grey/colourless.

<u>Future direction and improvements</u>

To improve this experiment the following variables could be monitored in the future:

- Egg distance/location on transect (potential disturbance)
- Rock size where eggs are found
- Size of individual clingfish
- Whole shore search to map zonation of individuals
- Algae and other species cover of rocks

It would be interesting to see if there is a correlation between the number of adults observed and new egg clusters found. The change in individuals over time could also be looked into to see if the proportion changed with season.

Conclusion:

I hope that the 2017 long-term volunteers will enjoy continuing this experiment to determine the seasonality and breeding cycle of the shore clingfish. A good preliminary study has been completed with ideas for future direction considered for more robust results in the future, including the recording of other variables discussed.

Ruby Temple-Long

(Long-term Volunteer 2017)