Prawnz post-release survival field experiment

Field methods

To investigate the influence of handling and environmental factors on the post-release survival of spot prawns, we designed a field experiment subjecting prawns to different handling treatments and environmental factors. We are specifically interested in how prawn survival varies with time out of water and air temperature. We are further interested in whether, on average, prawns of certain sizes or stages survive at higher rates than others. Throughout May and June 2022, we conducted 23 experimental trials in Musgamagw Dzawada’enuxw territory (DFO Area 12).

A given trial was conducted as follows:

* Set a string of 10 baited prawn traps within target depth range (30-60 fa). Let string soak for 24-48 hours.
* Haul string up. Before hauling, we collect air temperature, water temperature (0 m and 10 m), and water salinity (0 m and 10 m).
* During hauling, each trap is emptied into a small square white bin (10 L) with holes. Each white bin is put in a large fish tote filled with sea water for the duration of the hauling process. We count the number of prawns as we’re hauling so we know how many to assign per treatment. Our minimum number to conduct a trial is 35 individuals per treatment and our maximum is 70. If we have enough prawns for four treatments but not five, we cut the 120 minute treatment.
* Once hauling finishes, we first set up the ‘immediate release’ treatment. We take out the number of prawns that will be in the immediate release treatment and put them in a bucket of sea water. In a second 20 L bucket of seawater we submerge a mesh bag with the opening hung over the edge of the bucket. We begin to tag the prawns with a small elastic band put on their rostrum with forceps. Each prawn is taken out of the bucket, banded, and immediately placed in the submerged mesh bag. Once all the prawns for that treatment have been banded, the mesh bag is cinched shut and we clip it to a 10 fathom (20 m) line that hangs over the side of the boat. There is a small fishing weight in the bag so it sinks to the end of the line.
* After the ‘immediate release’ treatment is set up, we pull the rest of the holey white bins out of the fish tote and place them on the deck of the boat, under the canopy so as not to be in direct light. At this point, the trial ‘begins’ and we set a timer for the 30-minute treatment. We sort prawns such that each treatment has 2 white bins of prawns. For example, if we have 70 prawns per treatment, there will be two white bins with 35 prawns per bin. We start banding the prawns for each treatment (30 min, 60 min, 90 min, 120 min) with a different coloured band. When the timer for the 30 minute treatment goes off, we put the prawns for that treatment in a mesh bag and clip it to the same line that the ‘immediate release’ treatment bag is hanging on. The mesh bag has a small weight in it and descends down to hang at the same depth as the other bag. For each treatment time, we do the same thing. When the final timer goes off (90 min or 120 min, depending on how many prawns we had), the last treatment of prawns are put in a mesh bag and hung off the boat.
* Before we pull up all the mesh bags, we get the traps they will be put in ready. We distribute the prawns across six standard 30” prawn traps with the tunnels tied shut such that prawns cannot escape. Each trap is baited to minimize cannibalization. Once the traps are set up and ready to go, we pull all the mesh bags out of the water and haphazardly distribute individuals from each treatment across the six traps. The goal here is to ensure each trap has a mix of treatments to avoid confounding treatment effect with trap effect.
* Once prawns are distributed, we close the traps, and reset the string of six traps in the same spot they were hauled from at as close to the same depth as is possible. We tracked how long it takes from the time the trial ends and the mesh bags come out of the water to the time the final trap goes in the water during re-setting. This time ranged from 5-10 minutes.
* We leave the string of traps to soak overnight, for approximately 24 hours. The next day, we return and haul the string. We collect air temperature, water temperature, and water salinity. Just as before, each trap goes into a small white bin which in turn is put in the large fish tote of sea water.
* After we finish re-hauling the string, we go trap by trap to first collect survival data. For each trap, we record the band colour, stage (juvenile, male, transitional, female, egged female, spent female) and the carapace length of each prawn and whether they are dead, alive, or scavenged. We consider a prawn dead if their gill filaments are not moving at all. A prawn is scavenged if they are dead and also missing body parts. For dead and scavenged prawns, we remove their band and return them to the ocean. As we count and measure, alive prawns are placed in a mesh bag submerged in a 20 L bucket of water. We keep prawns separated by which trap they came up in, so there is one mesh bag per trap and each mesh bag is hung off the boat at 10 fathoms (20 m) to maintain the prawns in the condition they came up in.
* After we collect survival data for all traps, we assay each alive prawn for a suite of ten reflex behaviours. This approach is based on (Stoner 2012) who developed a set of ten reflex behaviours that cumulatively predicted long term survival in a lab study of spot prawns. Each prawn is assessed for how many of the reflex behaviours they display, resulting in a cumulative score that could range from 0-10. Here, a score of zero would indicate a prawn that is alive but displays no other behaviours (poor condition) and a score of ten would indicate a prawn that is alive and displays all assessed reflex behaviours (good condition).
* After we assess a prawn for reflex behaviours, we remove its nose band and return it to the ocean.