

The use of heart rate monitors to determine the effects of environmental stressors in the common shore crab (*Carcinus maenas*)

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Figure 1: *Carcinus maenas* with HONOR 6 device

Heart rate monitoring

- Previous equipment either wired or invasive
- Infra-red light used to measure heart rate
- New, wireless and Bluetooth connectable devices not tested
- The devices work on humans so why not crabs?

- ***Carcinus maenas***
- Widespread and highly invasive
- Tolerant to many environmental stressors
- Habitats in often in sewage outlet areas; Langstone Harbour, Portsmouth



Figure 2: *C. maenas* heart rate at 100 bpm while being held

Size vs heart rate

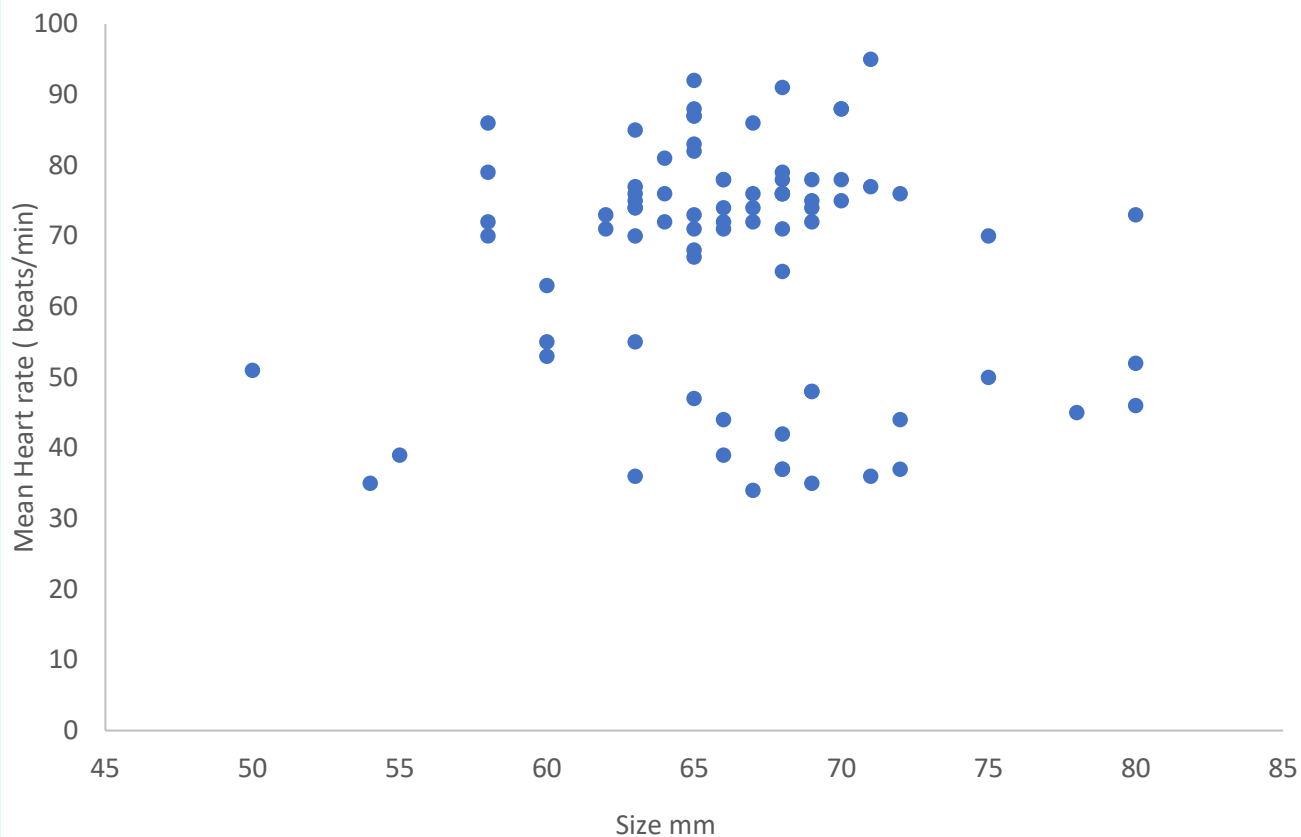


Figure 3: The size (mm) of the crabs versus the average heart rate over 2-4 weeks of wearing the device.

- 81 crabs, mix of colours, sex and size.
- Currently, no relationship between size and heart rate
- Previous research has stated 'The smaller the crab, the faster the heart rate'
- Average HR from the 2 to 4 weeks of wearing device
- Next set of data might show a different relationship

Heart rate vs colour

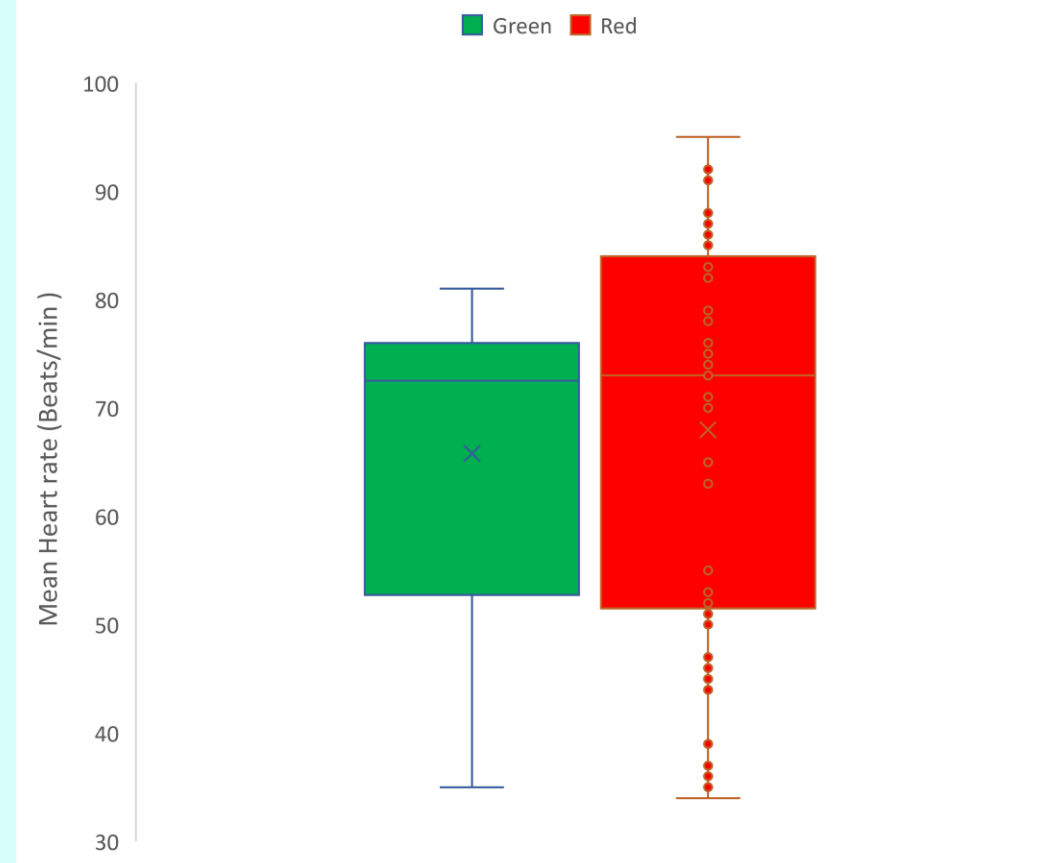


Figure 5: Average Heart rate vs Colour morphology

- No significant difference
- Previous research suggests red morphs will have a higher HR during experiments
- Previous research states 'Greens are more tolerant'



Figure 4: Female green colour morph (L) and Male red colour morph (R)

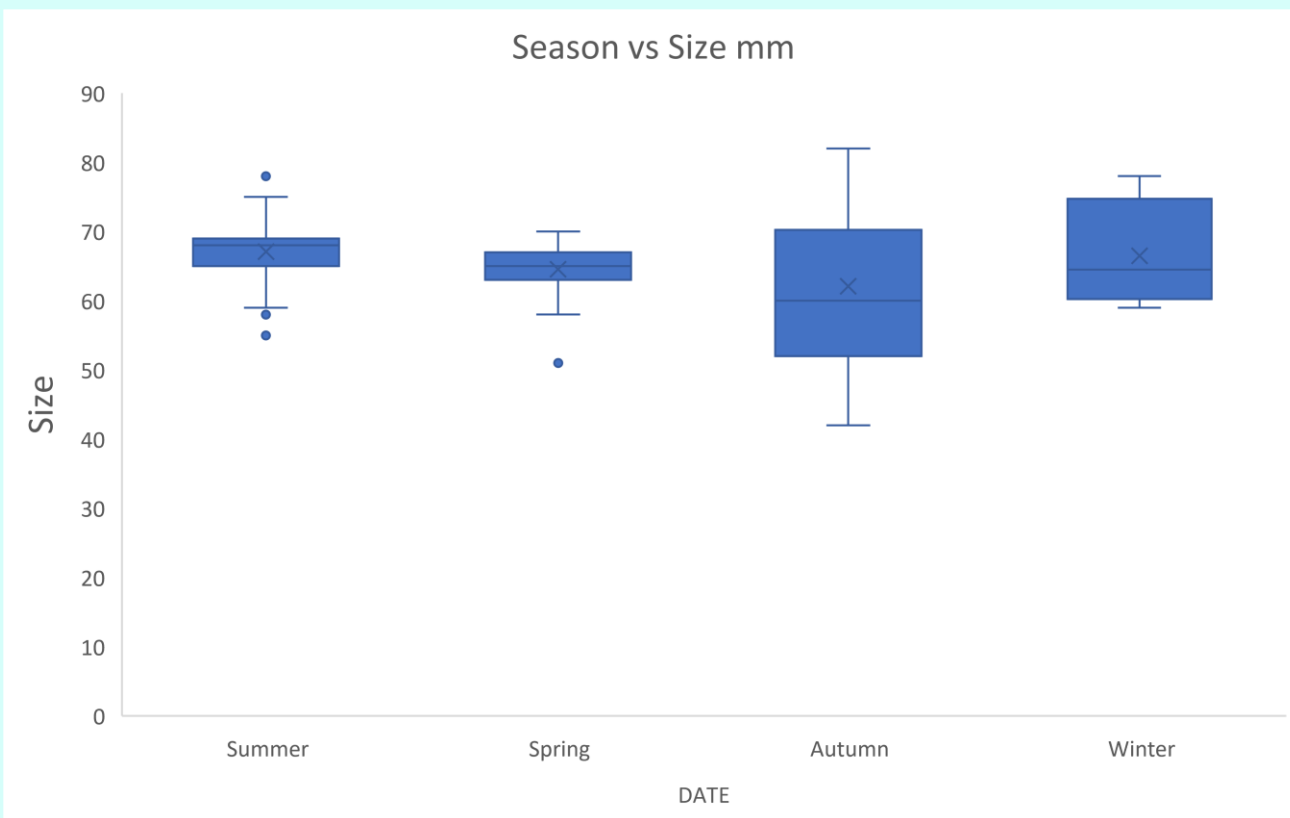


Figure 6: Size (mm) of crab caught during different season

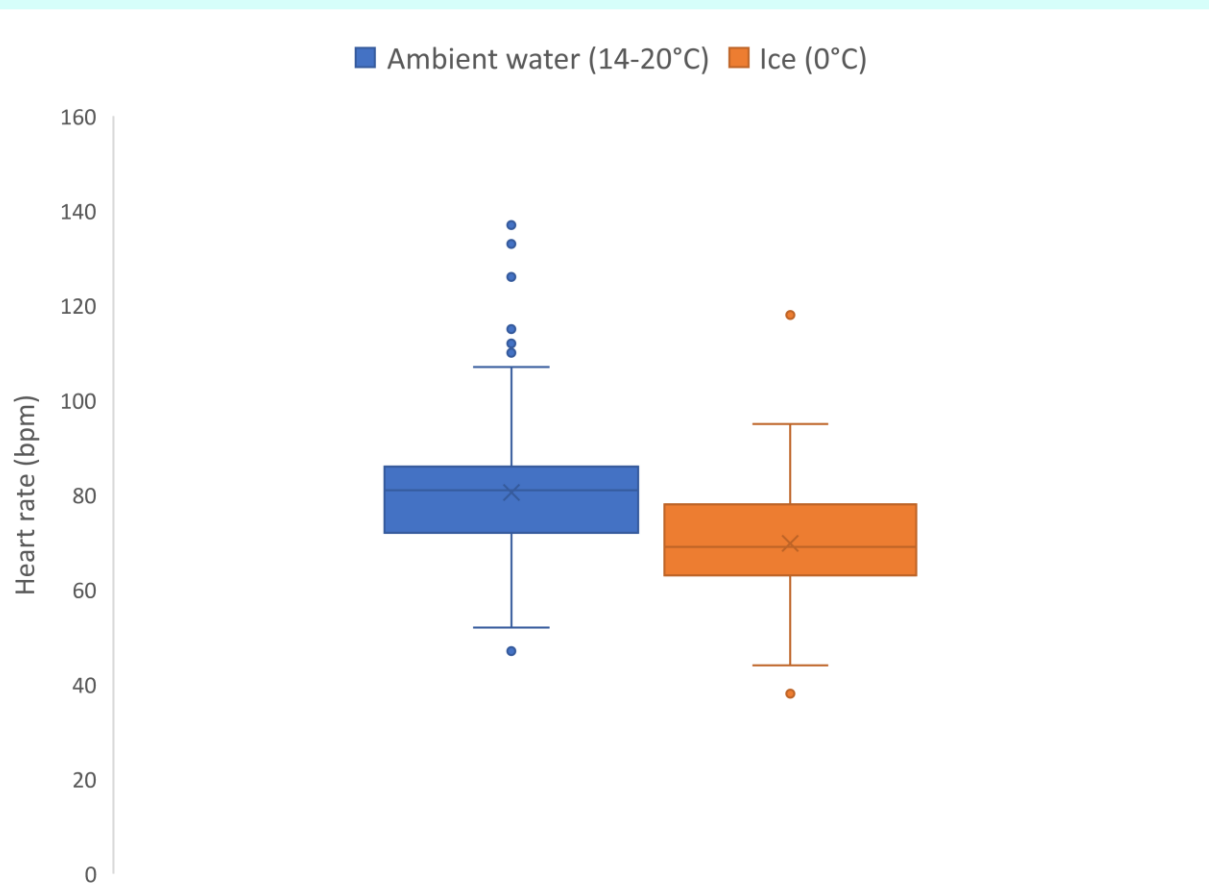


Figure 7: Pre vs post ice heart rate of 42 crabs through May to July

- Crab mating season is in Autumn,
- The big crabs were male and most of them red colour morph and The smallest crabs were green colour morph (Autumn).
- Big range of sizes over the seasons in both colours



Figure 8: Crabs with devices in the treatment buckets, 2 to 3 crabs per bucket.

- There was a significant difference of less than 0.001
- The ice treatment was for 30 minutes in the ice then back into ambient temperature for 30 and repeated for 3 to 4 hours.
- Ambient temperature ranged between 16 to 18.5 degrees Celsius between May and July.