

Adaptive Responses to High Environmental Ammonia in European Seabass Acclimated to Different Salinities

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Introduction

- Ammonia toxicity is one of the major problems in aquatic natural environments and culture systems.
- European Seabass (*Dicentrarchus labrax*), an important fish species for aquaculture, is a euryhaline species, implying that they are capable of living in environments of wide range salinity.
- This experimental study will seek to establish the adaptability of the fish to High Environmental Ammonia (HEA), at different ambient salinities.

Methods

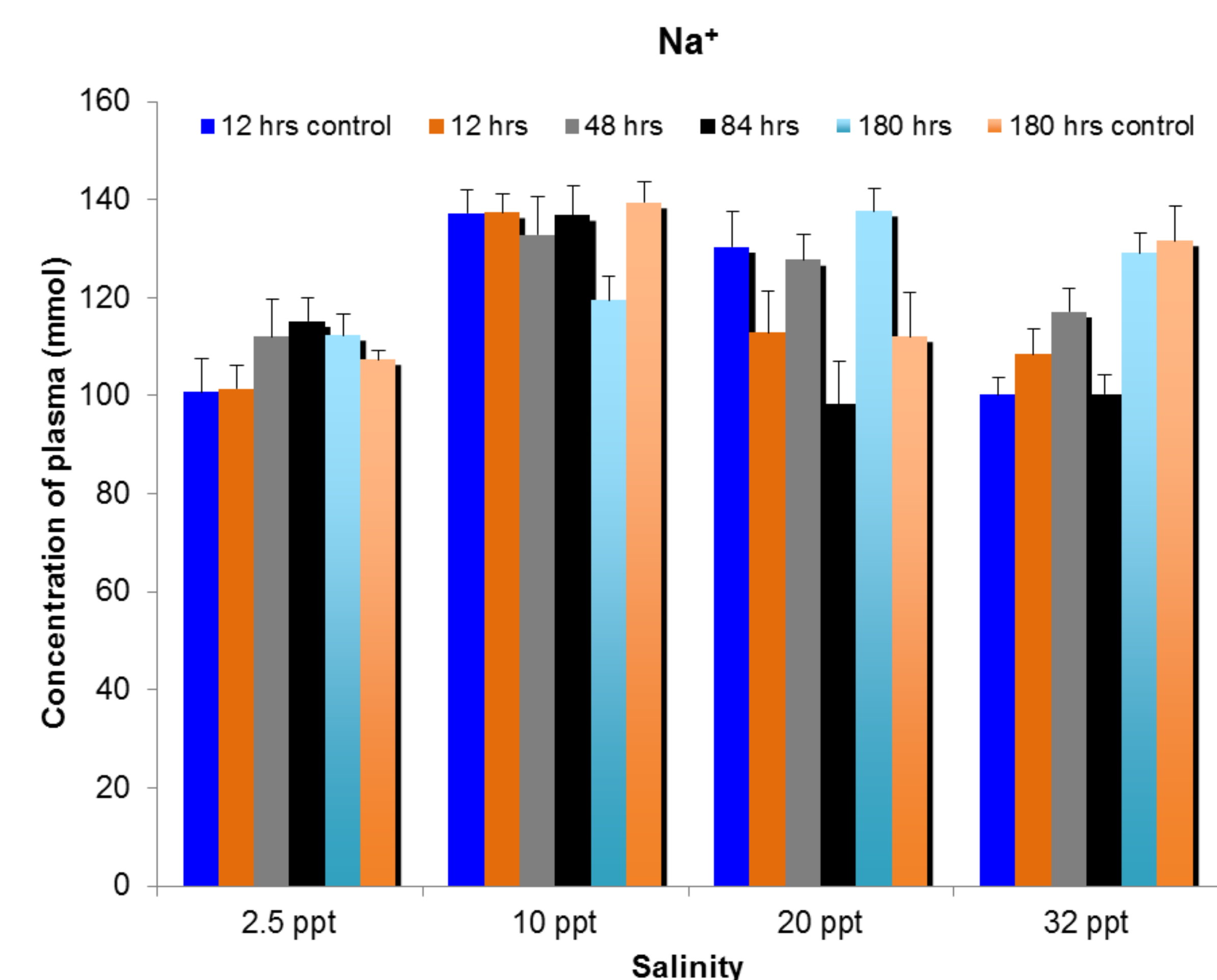
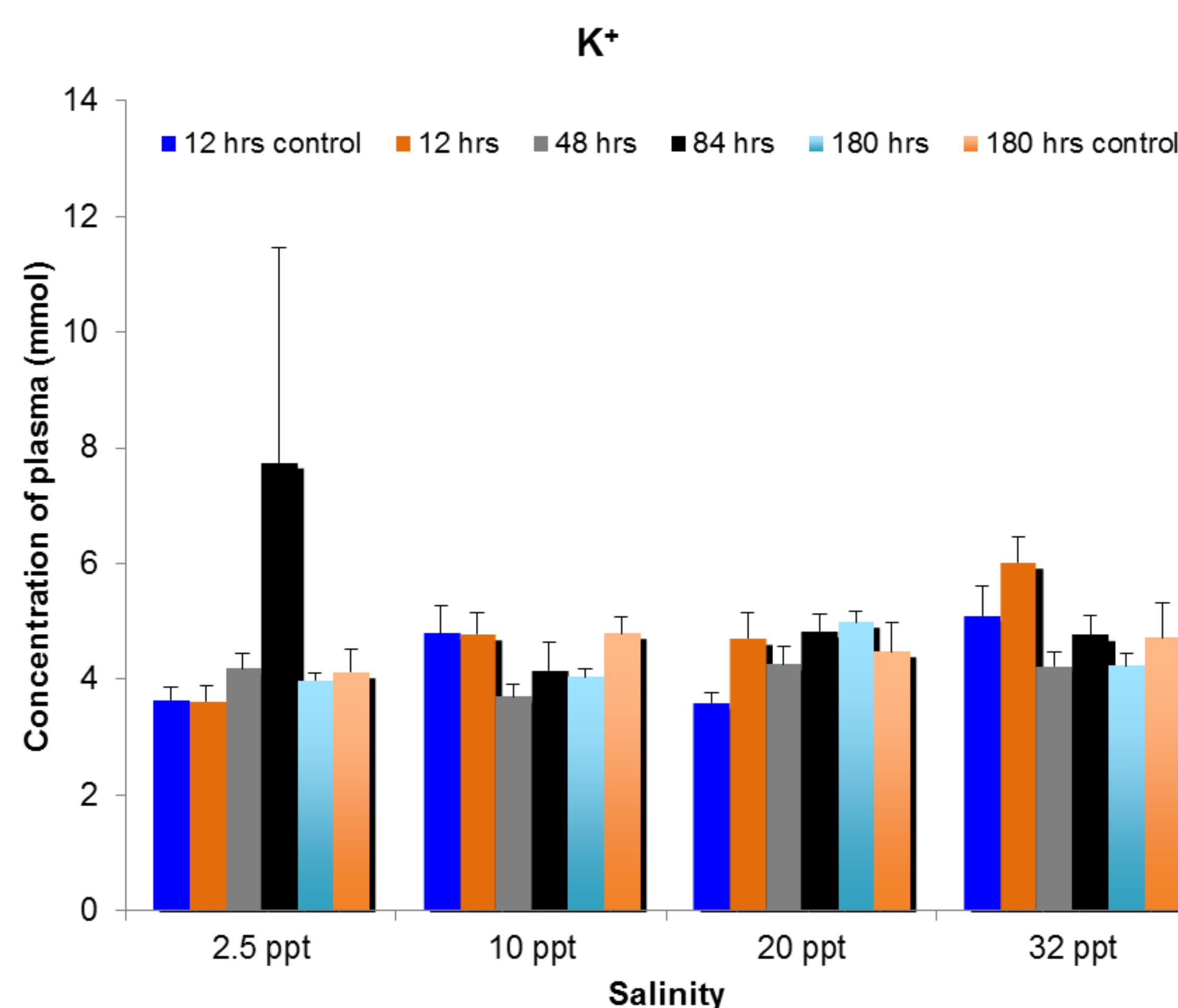
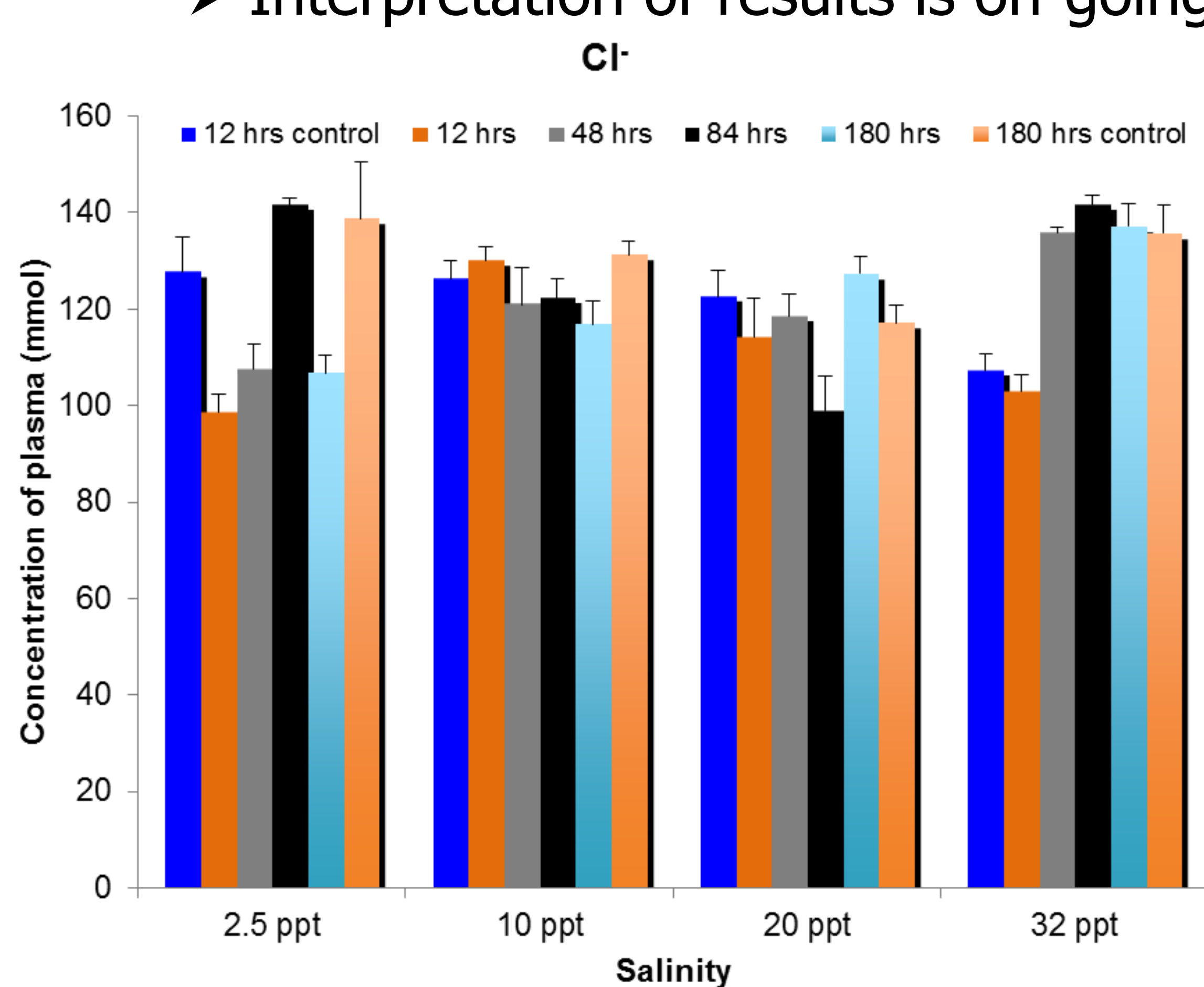
- The researchers will expose European sea bass acclimated to HEA (20 mgL⁻¹), and feed at up to 2% of body weight, to different salinities (32 ‰, 20 ‰, 10 ‰ and 2.5 ‰) in different experimental tanks.
- The adaptive response of the fish will be observed after 0h (control), 12h, 48h, 84h and 180h intervals.
- Additionally, ammonia excretion rate and ammonia quotient (AQ) will be taken at each interval to help draw conclusions about the fish's adaptive responses to different ambient salinities.
- After each interval, fish will be removed from the tank and blood drawn from them for serology. At the end of the experiment, the fishes will be dissected and liver, brain, white muscle, gill and kidney tissues obtained for analysis.

Objectives

To determine the physiological, metabolic, hormonal and ion-regulatory responses in the European seabass acclimated to different salinities combined with High Environmental Ammonia Exposure.

Preliminary Results

- Ions status in plasma response to HEA and Salinity.
- Interpretation of results is on-going.



Expected outcome

- It is expected that fish would suffer marked disturbance of normal functions following prolonged exposure to HEA.
- Additionally, it is expected that ammonia excretion by the fish would increase in an attempt to maintain the positive ammonia gradient.
- However, the levels of ammonia in plasma and muscles, lactate accumulation in muscles and the ammonia quotient are expected to markedly increase.
- High salinity environments have been shown to augment ammonia toxicity because it facilitates increased concentration of the NH₃ moiety, which is solely responsible for ammonia toxicity, in aqueous ammonia.
- As such, these changes, and even loss of function, will be expected to be more severe in fish exposed to higher salinities.