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Probable Susceptibility of Dugongs to Capture Stress

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ABSTRACT

The extremely high serum potassium levels of dugongs that have been chased with a speedboat, harpooned and drowned suggest that they may be susceptible to the capture stress syndrome. The resultant implications for research and management policy are discussed.

Over the last 10-15 years a considerable amount of data has accumulated about the effects of chasing, capturing and handling ungulates. A major concern developed when it was found that a large percentage of animals died within a few hours to several weeks of chase, handling and capture. This syndrome known as *capture myopathy* or *capture stress* (which is reviewed by Chalmers & Barrett (1982)) has been reported in a range of avian and mammalian taxa but is best known among ungulates for which procedures have been developed to prevent or greatly reduce losses (Harthoorn, in press).

Anderson (1982) has suggested that the dugong might be considered a marine analogue of ungulates and that on this basis consideration should be given to the possibility of capture stress (Anderson, 1981).

One of the physiological manifestations of capture stress is an elevated level of serum potassium. This results from free myoglobin originating from ruptured muscle fibres and from ionic shifts due to the high degree of

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anaerobic metabolism during the chase, which causes build up in lactate levels and a consequent drop in blood pH (Harthoorn, in press).

In July 1979, blood was obtained within 20 min of death from two healthy, reproductively active, male dugongs killed by Aboriginal hunters near Mornington Island in the Gulf of Carpentaria. The animals had been harpooned while being chased by a speedboat at 10–12 knots (as described by Marsh *et al.*, 1981) and were dispatched by drowning with amazingly little effort on the part of the hunters. Analysis of their blood by automated techniques at the Commonwealth Health Laboratory, Townsville, revealed serum potassium values in excess of 10 m-equiv litre⁻¹. The serum showed no evidence of a haemolysis and care was taken to minimize the possibility of potassium leakage from erythrocytes during its preparation. In contrast, blood similarly obtained from a neonatal male (euthanased by interperitoneal lethobarb after several days in captivity, during which it refused all milk or food) and analysed using the same technique, had a serum potassium value of 5.3 m-equiv litre⁻¹, close to the value reported for Florida manatees *Trichechus manatus latirostris* by White *et al.* (1976).

The elevated serum potassium levels in dugongs that have been chased and drowned suggest a susceptibility to capture stress. This is reinforced by the experience of Heinsohn *et al.* (1976), who reported that a dugong entangled in a net collapsed and died before it could be freed, even though it was being supported at the surface and able to breathe freely.

The limited evidence available suggests that it would be advisable to regard dugongs as prone to capture stress until there is experimental proof to the contrary. This has clear implications for research and management policy. Boats powered by outboard motors are becoming increasingly available in dugong habitats. Their use may significantly increase any risk of stress effects, either in the course of unsuccessful hunts, or during pursuit by curious non-hunters. Where appropriate, protective legislation should be designed to take these into account. Research efforts involving netting or pursuit for marking or examination of animals should give consideration to the potential risk of pathological consequences of stress, and be designed accordingly.

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