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MORTALITY AT A HAWKSBILL TURTLE (*ERETMOCHELYS IMBRICATA*) REARING CENTER

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The hawksbill turtle (*Eretmochelys imbricata*) inhabits tropical reefs throughout the central Atlantic and Indo-Pacific regions and is listed by the IUCN Red List as Critically Endangered[1]. Threats include shrimp trawling, exploitation for tortoise shell and loss of nesting habitat[2]. 'Head-starting' projects have been initiated as a popular response to declining turtle populations. In July 1999 an outbreak of mortality occurred at the turtle-rearing unit on a privately owned island in the Arabian Gulf. This report presents health findings, hatchery treatments and provides recommendations made to improve hatchling health at the facility.

Background Hawksbill turtles were raised in ten large (4m diameter) and 15 small (1.5m diameter) above-ground fibre glass tanks and unfiltered sea water was piped directly into the tanks. Turtles were fed on a standard turtle pelleted diet (45% protein, Aquamax Grower, PMI Nutrition International, USA). When investigations were initiated 1,200 live hatchlings were present; 152 had died and 370 had been released. The turtles had been hatched in June in the original nests on the beach of the island.

Clinical history Mortality for the first month after hatching was 2-3%, but during investigations (second and third months) mortality was 12.5%. The manager reported that intra-specific aggression was causing bite injuries to the necks and cloacal region, which developed into crusty-yellow lesions. Before death turtles became anorexic and showed retarded growth.

Health investigations Skin lesion samples from live turtles were submitted for microbiological investigation. The samples yielded profuse mixed growths of *Aeromonas hydrophila, Proteus sp.* and haemolytic *E.* coli. Moderate growth of mixed anaerobes were also isolated. Cytology demonstrated an inflammatory skin infection with bacteria and fungal elements. Five diseased hatchlings were euthanased, examined post-mortem and formalin-fixed tissues and clinical samples were submitted to Idexx Laboratories (UK). Water samples from two hatchling tanks and a sick turtle tank were collected and submitted to Idexx Laboratories. The water samples had a high bacteriological content. Results from the dead turtles and water are presented in Tables 1 – 3 in the pdf document on the WME News website.

Diagnosis The health problems were caused by aggression that resulted in traumatic injuries and secondary bacterial and fungal infections. Clinical and laboratory findings supported a diagnosis of fungal dermatitis and stomatitis with secondary bacterial infection. Histopathology was unable to demonstrate predisposing or unrelated pathology in internal organs, supporting the conclusion that injuries and contaminated water conditions predisposed hatchlings to infection.

Treatments Sick hatchlings were separated into small tanks for treatment for 14 days and given enrofloxacin (Baytril 2.5%, Bayer, UK) 5mg/kg i.m. every 48 hours and topical iodine tincture (1:2 dilution) on the lesions with a five minute contact time once daily. Of the 80 sick turtles, one group of 23 were in poor condition (anorexic, weak, thin) and a second group of 57 had skin lesions, but were in better body condition. Of the first group 11 (48%) died during the period of treatment and 12 (52%) recovered. All 57 of the second group recovered. After a week of treatment the skin lesions had regressed in the surviving hatchlings.

Recommendations were made to: reduce the stocking density of hatchlings; release only healthy turtles; assess the health of hatchlings before release; monitor water quality; clean the tanks with sick turtles after feeding.

Conclusions Head-starting is an attempt to reduce the mortality of hatchlings by rearing them in captivity to a size at which their mortality rate in the wild should be lower[3]. However, the benefits of head-starting are uncertain and because hawksbill turtles become aggressive ten days after hatching, some biologists consider that they should be released by day 15. As the Gulf hawksbill turtle population is not known to be declining, the rationale for initiating this project was questionable.

Fig 1. Turtle hatchling with periorbital and neck lesions.

There is little information on the diseases of hawksbill turtles in captivity; systematic paecilomycosis has been reported in captive adults with multiple yellow skin nodules[4] and juvenile turtles are susceptible to developing traumatic ulcerative dermatitis caused by biting in overcrowded pens[5,6]. Fungi identified from necrotic skin lesions of hatchlings includes *Geotrichum* sp., *Penicillium* sp., *Scolecobasidium* sp., *Fusarium* sp., *Drechslera* sp., *Paecilomyces* sp. and *Rhodotorula* sp.[5]. Unfortunately the causative fungal agent was not isolated from these cases. Marine fungi are fastidious and culture may have been compromised by transport to the UK.

Bacterial pathogens associated with ulcerative dermatitis, stomatitis and pneumonia in turtle hatchlings include *Aeromonas hydrophila, Vibrio alginolyticus, Pseudomonas fluorescens, Flavobacterium* sp., *Micrococcus* sp. and *Bacillus* sp.[5]. It is also important to consider tuberculosis in the differential diagnosis of cases where granulomas are observed.

Unfortunately, the health problems arising at this center were also complicated by management decisions that included:

1) collecting more hatchlings (1500) than the facility capacity (200).
2) delaying release because the island owner wanted to see bigger hatchlings.
3) releasing diseased hatchlings because the island owner didn't want sick animals at 'his' facility.
4) no monitoring to measure the success or otherwise of the release.

Ideally to be successful, head-starting schemes should follow internationally established guidelines including a strong veterinary component[7]. Suboptimal care of juvenile turtles results in metabolic and physical changes that are not conducive to their long-term survival in the wild or captivity. As such abnormalities are not often apparent upon visual examination, the use of diagnostic tests is necessary to determine the health status of animals before release. However, while veterinary and biological protocols can be designed comparatively easily, the political aspects of wildlife projects in the Middle East can often be problematic!

References and Tables are available in the pdf version on wmenews.com

Fig 2. Turtle hatchlings in treatment tanks.