IN SITU INCUBATION OF SEA TURTLE EGGS AT CHAGAR HUTANG, PULAU REDANG

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Introduction

In many of the sea turtle conservation programmes in Malaysia, eggs are incubated and protected in beach hatcheries. There are arguments against this approach as hatch success may be compromised and the hatchlings produced are sex-biased since the hatcheries are usually fully exposed to solar radiation and subjected to high incubation temperatures. This study was therefore designed to introduce *in situ* incubation and to demonstrate that this technique is viable and provides an alternative to sea turtle egg incubation and protection programmes in the country. It also seeks to investigate the factors that may account for hatch failure under natural conditions. The study highlights the complimentary role which universities can perform in sea turtle conservation.

Materials and Methods

Egg clutches deposited in the months of April/May to 31 August of 1993 to 1998 in Chagar Hutang beach, Pulau Redang were purchased from licensed egg collectors at RM110.00 and RM120.00 per clutch for green and hawksbill turtles respectively for incubation. The nests were marked and left in their natural (*in situ*) nests to incubate to full-term. The entire beach was guarded round the clock to ward off natural predators and potential human poachers. The nests were inspected several times per day for signs of predation or hatchling emergence and activity. Emerging hatchlings were not restrained but allowed to crawl naturally to the sea. A few days after hatchling emergence, each nest was excavated to determine number of hatchlings emerged (from number of empty hatched shells), number of dead and live hatchlings in the nest, and number of unhatched eggs. Mortality factors such as damage by nesting turtles, depredation by monitor lizards, ants, crabs and plant roots were also recorded for each nest. Emergence success was computed based on the number of healthy live hatchlings produced from each nest. Data from individual nests were summed to provide data on yearly output of hatchlings.

Results and Discussion

The number of egg clutches incubated per year from 1993 to 1998 ranged from 202 to 401. At RM101.00 per clutch, the funds disbursed for egg purchase have ranged from RM22,220 to RM44,210 per year. The egg clutches incubated represented 51 to 95% of the clutches deposited in Chagar Hutang during the period of egg purchase. Our records indicate that in recent years (1997-98), egg collectors have become more willing to sell their eggs to the project for incubation, as opposed to removing them for sale in the markets. The egg clutches purchased translated to a range of 18,700 to 38,122 eggs incubated per year. This represented 33, 36, 46, 75, 68 and 71% of the total number of eggs incubated for the whole of Pulau Redang from 1993 to 1998 respectively. These figures indicate that our *in situ* egg incubation programme is assuming an increasingly important role in turtle conservation in the island. This is not surprising as Chagar Hutang is the major nesting beach in Redang, and accounts for 41 to 58% of the total egg production. The Fisheries Department protects eggs deposited in Mak Kepit which accounts for 20 to 30% of the island's egg production. The combined efforts of UPMT and the Fisheries Department protect only 37 to 61% of total egg production in Redang each year. This level of protection is inadequate for population sustainability. Turtle conservationists recommend that at least 70% of the eggs be protected in order that nesting populations can be maintained at their current levels. Emergence success attained have ranged from 78 to 82%. The differential rates obtained from year to year are a reflection of the varying effects of mortality factors. These rates compare favourably with those reported for green turtles elsewhere (Whitmore and Dutton, 1985; Fowler, 1979). Hatch rates from hatcheries usually average about 70%. Predators of eggs and hatchlings in Chagar Hutang included monitor lizards (up to 11% of nests affected), ghost crabs (22%), hermit crabs 2%), and ants 22%). Other mortality factors were the nesting activities of turtles (up to 2% of nests affected) and plant root invasion (33%). Although these factors lowered emergence success, their effects did not appear to pose serious threats to the success of in situ nests.

Conclusions

This study demonstrates that *in situ* incubation of turtle eggs can be highly successful and is superior to the common practice of hatchery incubation. Although natural mortality factors are present, their effects do not pose threats to the success of *in situ* nests. Universities can play an important role in turtle conservation and help to increase the level of egg protection achieved in government programmes. However, the necessity of disbursing funds for the purchase of eggs for incubation renders turtle conservation is an expensive exercise. Local authorities should be urged to rethink the decades-long practice of licensing egg collection.

References

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