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**REPRODUCTIVE BEHAVIOR AND PHYSIOLOGY OF MARINE TURTLES:**  
**RESULTS OF RECENT RESEARCH**

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**Imprinting studies:** Grassman conducted laboratory protocols in which hatchling C. mydas, C. Caretta or L. kempi were exposed to natural beach sands and solutions or artificial media and chemicals. Chemical exposures were either: A. nest only, B. tank water only or C. nest and tank. The turtles were less than one year of age when their responses to these same chemicals were evaluated in a multiple choice arena. The following conclusions are derived from this work:

1. Sea turtles can orient to specific chemical cues learned early in life without formal conditioning.
2. They can distinguish between low concentrations of solutions prepared from natural beaches.
3. In our apparatus, immature turtles appear to show imprinting (Lorenzian definition) to chemicals to which they have been exposed early in life.
4. Exposure both in the nest and the tank water was necessary for any consistent responses in our system. This amounts to a prolonged exposure of several weeks.

We intend to test a similar protocol with adult turtles in the near future.

**Reproductive behavior studies:** Comuzzie has worked with the Woods at Cayman Turtle Farm and developed an ethogram of adult C. mydas behaviors observed in captivity. Specific behaviors described include checks, nuzzels, bites, circling, chases, attempted mounts, mounts, escorts, following, gapes, cloacal checks, faces and pushes. Bites, circling and biting, chasing and mounts were

also seen in a wild population in Australia. Males did not discriminate between active and inactive females when giving cloacal checks and may use this behavior to evaluate active females. Females cloacal checked other females but not males. Females appear to have a series of mating avoidance behaviors as a way of selecting the fittest males. Females are active in escorting but not once they have been mated.

Rostal has undertaken a similar study with captive reared L. kemp at the Cayman Turtle Farm. These smaller-quicker animals have a less diverse and possibly more subtle behavioral repertoire. Much of the mating occurs at night in these turtles and they appear very secretive. Endocrine levels are being determined for comparisons with wild ridleys and other sea turtle species.

**Reproductive hormone studies:** Several studies are being compiled by Wibbels on work with Limpus in Australia, NMFS in Florida and Marquez in Mexico. Testosterone and spermatogenesis peak prior to mating and decrease through a distinct mating season. Some males appear to be multi-annual, like females. A softened medial plastron patch is characteristic of reproductively active males in several species. In females, estrogen is secreted at fairly low levels over the non-nesting years to drive a slow follicle enlargement phase. A peak in estrogen occurs in Spring prior to migration and during maturation of subsequent clutches. Thyroxin ( $T_4$ ) peaks in early Spring prior to a testosterone surge which appears to initiate migratory behavior.

Figler has studied the hormone arginine vasotocin in sea turtles. He found a steep peak in the circulating level of this molecule coincident with oviposition. This hormone may be of use when nesters have difficulty in dropping eggs. This work was supported by Sea Grant # NA83AA-D-00061, NSF grant # BNF-8418538, Cayman Turtle Farm and by Sea Turtles, Inc.