EXPERIMENT ON DUMMY PTTS ATTACHMENT WITH TURTLES IN CAPTIVITY

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ABSTRACT

Since detachment of Platform Transmitter Terminals (PTTs) from the carapace of sea turtle will result in missing location signals, a study was conducted to investigate their durability on captive turtles maintained at the Sea Turtle Conservation Station at Mannai Island, Rayong Province, Thailand in 2001. Four dummy PTTs were attached to the turtles using techniques and materials that were identical to those employed in actual field satellite tracking studies. The results showed that the dummy PTTs could stay intact on the carapace up to 115 and 240 days. Hence even the shortest duration in this experiment exceeded the time period for which the last signals were received from the longest staying PTT model KiwiSat101 in field studies. Antennas which were positioned posteriorly appeared less likely to be damaged. Further the carbon fiber sheets used in all dummy PTTs started to fray within 30-60 days. Thus, it was concluded that apart from deploying the PTTs with the antenna in the posterior position and improvements in the carbon fiber materials used, the current method was appropriate for field studies.

Keywords: sea turtle, Platform Transmitter Terminal, deployment technique

INTRODUCTION

Satellite telemetry is one of the methods used for studying the long-distance migration of sea turtles in many areas. There are many models of satellite transmitters or Platform Transmitter Terminals (PTTs) available today and each model provides a different specific option. For example, model ST-18 of Telonics, U.S.A. can supply a battery power of 0.5 Watts, duty cycle of 8 hours/day, a battery life of 255 days with a salt-water switch and provides information on position only. Kiwi Sat 101 from Sirtrack Limited, New Zealand supplies 1.0 Watts power, duty cycle of 24 hours/day, a battery life of 150 days with a salt-water switch and is capable of providing information on position, surface time and surface temperature. Notwithstanding, the most important requirement for scientists is transmission of data from the PTT for as long a period as possible. Good data would be lost if the methods and materials for deploying the PTT on the turtle are inappropriate, such as wrong positions used, and insecure methods of PTT attachment, causing it to break loose too quickly. The objective of this experiment was therefore conducted to determine; 1) how long the attached PTT would stay, using the same materials and methods currently employed in actual field studies, 2) orientation and position of the PTT that is most appropriate for fixing on the carapace of the turtle and for transmitting good signals.

MATERIALS AND METHODS

The experiment was conducted at the breeding pond of Sea Turtle Conservation Station at Mannai Island, from March to November 2001. Four dummy PTTs were made from fiber-glass resin in exactly the same shape and size as the original Kiwi Sat 101. The shape is long oval with 18.0 x 8.5 cm and 600 g in weight. These were fitted onto the

experimental animals following the same methods and using the same materials (putty glue, epoxy glue and fiber sheet) employed in actual field studies as described in Sakamoto et al. (1997).

A green turtle (*Chelonia mydas*) and an adult hawksbill turtle (*Eretmochelys imbricata*) were each attached with a dummy PTT with the antenna set towards the anterior of the animal. A second green and hawksbill turtle were further fitted with PTTs, but with the antenna set towards the posterior of the animals. After the PTTs were successfully deployed, they were released into the breeding pond. The details of each turtle are shown in Tab. 1. Observations on the condition of the dummy PTTs on the experimental turtles were made every day during non-feeding times until the dummy transmitter became loose or the turtle expired, whichever occurred first.

Table 1. Information on the experimental turtles.

Sample and Flipper Tag No.	Position of Antenna	Internal tag No.	CCW(cm)	CCL (cm)	Weight (kg)
Green 0592	Anterior	116-422-523	76	81	51.6
Green 0593	Posterior	006-039-088	66	74	52.4
Hawksbill 0059	Anterior	000-285-122	72	77	59.0
Hawksbill 0080	Posterior	000-618-818	68	75	51.0

RESULTS

The results of the observation on each turtle are summarised in Tab. 2.

Green turtle No. 116-422-523 lost the antenna four days after release and after one month the fiber sheet covering dummy PTT started to fray. All parts of dummy PTT was detached and lost after 115 days. For green turtle No. 006-039-088, the antenna was intact throughout the observational period. However, it became twisted after four days. As in the previous turtle, fiber sheet covering dummy PTT started to fray after one month. Unfortunately, this turtle died on the 171st day after it was released. Cause of death was attributed to over-consumption of the leaves of umbrella tree (*Terminalia catappa* Linn.). It was noted that the dummy PTT was still attached to the dead turtle even thought the fiber sheet had frayed away.

Hawksbill turtle No. 000-285-122 lost the antenna after the fourth day of release. The fiber sheet covering the dummy PTT also started to fray after one month and by the end of the second month, almost all of it had frayed away. Up to this date (9 November 2001), i.e. about 240 days after the dummy PTT was deployed, it remains attached to the turtle.

Hawksbill turtle No. 000-618-818, the antenna remained intact, but became twisted four days after release. After one month, the fiber sheet covering the dummy started to fray and was almost completely frayed out 1-2 mouths after release. This turtle died 220 days after release, with the dummy still attached even though the fiber sheet had frayed away.

Table 2. Summary observation for dummy PTT attachment with turtles in captivity

Sample and External tag no.	Period of dummy PTT stay after attached (day)			Position of Antenna
	Antenna loss	Fiber sheet loss	Durability of Body of dummy PTT	
Green 0592	4	30-60	115	Anterior
Green 0593	171 twist	30-60	171	Posterior
Hawksbill 0059	4	30-60	240	Anterior
Hawksbill 0080	220 twist	30-60	220	Posterior

CONCLUSION

Techniques and materials used for PTT attachment in this experiment showed that the dummy could remain attached on the turtles at least 115 days, with the longest at 240 days. Compared to turtles in field studies during 2000-2001 by Charuchinda et al. (2000), the duration of tracking data received from seven female green turtles fitted with Kiwi Sat 101 ranged from 67-118 days (Table 3). Hence, the method used in this study to deploy PTTs appeared appropriate for tracking sea turtles in the field. However, it is recommended that the PTT be deployed with the antenna in the posterior position. Further, the type of carbon fiber sheeting material used needs to be reassessed.

Table 3. Duration of signal transmission from Kiwi Sat 101 in 2000-2001 (Charuchinda et al., 2000).

Sample	Position Antenna attach	CCW (cm)	CCL (cm)	Weight (kg)	Period of signal sending (day)
ID 16723	Anterior	86.0	98.0	112	83
ID 09786	Anterior	81.4	95.7	110	92
ID 09804	Anterior	90.0	98.5	86	74
ID 09785	Anterior	89.7	98.5	80	100
ID 09787	Anterior	80.7	88.9	94	93
ID 09788	Anterior	75.5	81.0	69	67
ID 17682	Anterior	85.0	95.0	100	118

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