

Turtles - Micropepsia  
#772

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WEST FAYU TURTLE SURVEY, 1972

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## I. BACKGROUND

It had been hoped that a complete survey of the resources of West Fayu Atoll could be undertaken during the entire nesting season of 1972. However, due to lack of funds and other unforeseen difficulties, the survey had to be compressed into two months, July and August, and the results therefore do not reflect a clear picture of the entire mating and nesting season's activities.

A preliminary trip was made to West Fayu aboard the National Marine Fisheries Service research vessel Townsend Cromwell in March, 1972. The Cromwell was on a bait fish exploring and research survey and the personnel had agreed to transport supplies to the proposed survey site. Material and food supplies purchased in Hawaii with funds provided by the Marine Resources Division of the Trust Territory Government were dropped off at West Fayu and a short two-day trip was taken to Pikelot Island.

At Pikelot, the four Satawal members of the survey team were instructed by the scientific personnel in methods of turtle tagging, measuring, and preservation of stomach contents. The survey party then returned via the ship for a short while to West Fayu and were transported back to Satawal. In addition to myself, the survey crew from Satawal consisted of Piyailuk (in charge of Satawal men), Reppoulug, Namlug, and Recheilam. The latter three of the men are younger former students of the Outer Islands High School at Ulithi and possess varying degrees of competency in English. The man in charge of the Satawal group, Piyailuk, is an older man, an accomplished canoe-navigator and builder, with little formal schooling. All the Satawal men connected with the survey undertook to participate in the program knowing that there would be no cash remuneration forthcoming from either the Trust Territory Division of Marine Resources or the National Marine Fisheries Service.

On a subsequent canoe voyage to West Fayu in May, I and the men of the survey team erected a water catchment with tin brought by the Cromwell and

carefully stored away the summer's provisions.

Due to ships' schedules, contrary sailing winds, and other factors, the actual start of the survey was delayed until the first week of July, when the team was transported from Satawal to West Fayu on the Trust Territory vessel M/V James Cook.

## II. GOALS OF THE SURVEY

Following advice from Dr. J. R. Hendrickson of the University of Arizona and Dr. Archie Carr of the University of Florida, the goals of this first survey were limited. The first objective was to determine the number of turtles that would nest during the stay at West Fayu, thus giving a clue to the population. Other information was sought which would give clues to the eco-geographic cycle of the population. It was felt that this information on both feeding and nesting grounds would be prime factors in establishing programs for management and protection of turtles. A program of tagging mature turtles was planned to help provide future information of this nature.

Following much discussion with various turtle authorities, it was decided to limit the third goal, that of raising hatchling turtles, to a purely experimental basis. Instead of attempting to raise large numbers of turtle hatchlings for release, focus was instead shifted to finding the appropriate methods of this type of activity that were best suited to West Fayu. This information, it was felt, would prove useful in future attempts at raising hatchlings at West Fayu or other sites in the central Carolines.

A fourth goal of the program was to collect stomach samples of mature turtles and forward them to Dr. Hendrickson at the University of Arizona where studies are being undertaken in turtle nutrition. Towards this end, sample bottles and formalin were provided by the scientific party aboard the Cromwell in March and stored on the island.

### III. THE SOLAR TRADER

On Christmas Eve, 1971, the M/V Solar Trader, a 7000 ton freighter with a load of automobiles bound from Yokohama to Sydney, went aground on the north side of the West Fayu reef. It remained there, breaking up in the seas that periodically pounded the hull. After much discussion among Trust Territory officials, the U.S. Coast Guard arranged for the Luzon Stevedoring Company of Manila, Philippines, to de-fuel the ship. Their operation began on July 10, 1972, and lasted for two weeks. The M/T Stanford and a barge were anchored in the West Fayu lagoon throughout this time. Although much of their operation was carried out around the clock about a mile from the island, turtles were observed to nest during the time the Stanford remained in the lagoon. Eventually, they off-loaded 165 tons of fuel oil from the Solar Trader and the oil can no longer be considered a threat to the island at West Fayu. However, during the extremely low tides of summer, oil was left on portions of the reef lying within approximately 500 yards of the ship. The oil-covered coral was then covered by a large growth of an unidentified long, stringy algae. At this time, it is impossible to say if that portion of the reef area affected (not over two percent of the total area) would alter turtle feeding habits or not.

### IV. MATING OF TURTLES IN THE WEST FAYU AREA

During many previous trips to West Fayu during the past three and one half years, I have observed many mating turtles in the lagoon and surrounding waters. Already mentioned has been the standard method for capturing such mating turtles. During the entire duration of the survey, however, not one group of mating turtles was sighted either within or without the lagoon. This is in marked contrast to previous years when mating turtles are observed throughout the nesting season.



A single large turtle was observed floating on the surface of the water on the ocean side of the reef on August 21, even though a near-constant watch was kept with binoculars throughout the duration of the survey. Whether this lack of mating groups of turtles can be attributed to activity of the M/T Stanford within the lagoon during the month of July or the numerous small oil slicks floating within the lagoon, can only be a point of conjecture.

#### V. NESTING

All turtles coming up on the island to nest were allowed to do so during the duration of the survey. Fourteen were observed to nest and three others nested and were not observed. Nesting procedures were similar to those described by Hendrickson (1955) and others.

Upon first arriving at the island, the survey team successfully spotted a total of ten previous nests which presumably contained viable clutches. (See map for position of nests.)

#### VI. TAGGING

Upon arrival at West Fayu in July, it was discovered that much of the previously set-up camp had been tampered with and the tag applicators were missing, along with measuring devices and other equipment. Dispatches were sent to the District Administrator in Yap and to the Marine Resources Division in Palau requesting additional applicators. These applicators were not received until July 25. During the following month, nesting turtles were scarce and only two were tagged and released. (See Table I)

## VII. RAISING OF HATCHLINGS

A more successful component of the survey was the attempt to raise hatchlings. After experimenting with various types of live cars, it was found that chicken wire and mesh tanks, plastered with concrete on the sides up to four feet, were the best. With the bottom left un-plastered, water filled the tank and the plastered sides kept the water relatively calm within and was able to withstand all but the strongest wave action in the lagoon. The tanks, although bulky and heavy, could be moved to alternate locations by the survey team, and placed in a hole dug in the sandy bottom when tides were extremely low. Two live cars of this type were constructed and lined with the plastic oil-spill booms left behind by the salvage crew of the M/T Stanford.

In addition to the live cars, which are approximately 4 x 8 feet, three shallow 55 gallon drumcans were also utilized when the number of hatchlings became too numerous for the live cars to handle. The drumcans were placed on the island in the shade and water was changed twice a day by the survey team.

The hatchlings were fed a steady diet of fish flesh during the time they were in the live cars. The usual practice would be for the survey team to go spear fishing in the morning, returning about noon to feed the hatchlings. The most common fish used were reef fish, squirrel fish, and spotted sea bass and the like. In addition, a small mackerel found in the lagoon in large numbers were captured in surround nets with some success. The fish were cut up into small pieces for the hatchlings in the drumcans and shredded and suspended in the live cars for those turtles penned there. Procuring enough fish for the hatchlings, even when they numbered over 220, proved to be little problem for the survey team, who had to fish each day for their own food anyway. With the abundance of fish in the lagoon, it is

estimated that three men could catch enough fish each day to feed 250 hatchlings until the turtles reached a carapace length of approximately 75 to 80 millimeters.

Hatchling mortality was limited, for the most part, to the first nest placed in the live cars. This was primarily due to the experimentation in various live cars and locations the cars were placed around the islands. A small number (3) were lost when they managed to get their heads caught in the small mesh of the live cars and were taken by eels.

Of the 239 hatchlings taken for raising, 191 survived the duration of the survey in captivity. Of the 48 mortalities, 37 occurred during the first two weeks to the first two groups of hatchlings placed in live cars. In contrast, only four of the 114 hatchlings making up the last two nests failed to survive. The overall mortality rate of 15% could be greatly reduced in the future by use of this type of live car and yet still compares well with the nest-to-sea mortality rate on West Fayu which is estimated at 75%.

#### VII. RAISING OF HATCHLINGS

Once above this size, the voracious appetites of the turtles would probably require more men or more efficient means of procuring fish.

Hatchling growth was monitored for each nest placed in the live cars during the survey (see Table). After reaching a carapace length of approximately 60 millimeters, each hatchling was marked by cutting and removing the third marginal plate from the rear right side of the carapace. This was done with a sharp knife and no ill effects were experienced by the turtles afterwards.

The final release of approximately 200 hatchlings was accomplished on the morning of August 28 by placing them in buckets and taking them outside the reef in the James Cook's ship's boat and releasing them in



20-25 fathoms. All except those turtles from Nest #7 which had not reached proper size were marked by the method described above.

#### VIII. COLLECTION OF STOMACH SAMPLES

The collection of stomach samples for eventual transport to the University of Arizona was carried out during the duration of the program. The samples ranged from approximately a cup to a pint in volume. No facility ~~is~~ available on West Fayu for accurate measurement or analysis, however, tentative identification showed algae and small bits of coral to make up the majority of samples taken.

#### IX. CONCLUSIONS

Although major problems were anticipated in coordinating a study of this type, additional problems - such as the <sup>DP</sup> disappearance of turtle tag applicators and equipment - present situations in which little can be done in so remote a region. If future programs are to be carried out, every effort should be made to charter transportation in order to adhere to time schedules previously agreed upon, rather than rely on field trip ships, which by their work schedules at other islands sometimes cannot keep previously appointed schedules. However, making the best of the situation, the master of the James Cook, Captain Weilbacher, and Chief Mate A. Ludwig did everything they could to insure the success of the entire survey. Great assistance was also rendered by Captain W. W. Bowers, Commander of the Naval Air Station at Agana, Guam, who arranged for several supply visits to the island during the survey.

Despite the problems first encountered with early models of constructed live cars, the design finally hit upon proved satisfactory



for the remainder of the survey and should be utilized in the future for similar work on the island. Much of the supplies used in construction of the live cars was supplied by Captain E. B. Villena of Luzon Stevedoring Company and Lieutenant William Key of the Navy. This design of live car is advisable over permanent tanks for their lesser cost, ease of transport, and ease of construction. Since varying winds can produce different wave conditions from day to day around the island, a portable type live car is preferable to permanent tanks constructed in the lagoon. It was shown that it is indeed feasible to raise hatchlings in this manner.

Tagging of mature nesting or mating turtles can be carried out on West Fayu, but the obviously smaller-than-anticipated population makes this activity more preferable on an island such as Pikelot where the population seems to be greater.

Collection of stomach samples can be collected with relative ease on West Fayu, the only governing factor being whether the person capturing the turtle wishes to slaughter it immediately or not. In the case of those taken during the survey, the turtle was butchered immediately after it completed nesting.

Despite all of the problems encountered, it should be remembered that this survey was the first of its kind ever undertaken on islands in this area and the lessons learned point to the conclusion that it is indeed a feasible and worthwhile undertaking. The following section on recommendations and a proposal for establishing a hatchery program on the island of West Fayu utilizes information gathered during this survey.

TABLE I

GREEN SEA TURTLES (CHELONIA MYDAS) CAPTURED ON PIKELOT IN 1972

DATE	SEX	CARAPACE		PLASTRON LENGTH
		Length	Width	
3/11*	F	1016	985	---
3/11	F	971	863	---
3/11	F	990	914	---
3/11	F	1003	939	---
3/11	F	939	850	---
3/11	F	1054	965	---
3/11	F	1016	888	---
3/11	F	1016	900	---
3/11	F	1092	990	---
3/24**	M	990	888	746
3/25	F	1003	945	800
3/25	M	1041	951	770
3/25	F	990	951	770
3/25	M	977	888	750
3/25	F	1098	978	840
3/25	M	977	888	760
3/25	F	1206	1124	920
3/25	F	1053	977	820
3/25	M	1002	900	760
3/25	M	1002	900	740
3/25***	F	1053	965	819

\* Brought to Satawal by two canoes from Pulap on March 11.  
 \*\* Captured and measured in connection with survey on R/V Townsend Cromwell.  
 \*\*\* Tagged and released on March 25 bearing Tag # 101. Captured on Pikelot on approximately May 18, 1972, by the crew of a Puluwat canoe and consumed on the island.

NOTE: All measurements are curve measurements, expressed in millimeters. This table does not represent those turtles taken by people from Puluwat and others of the Truk District's "Western Islands" during the course of the year.

TABLE II

GREEN SEA TURTLES (CHELONIA MYDAS) CAPTURED ON WEST FAYU IN 1972

DATE	SEX	CARAPACE		PLASTRON LENGTH
		Length	Width	
2/6	F	----	----	----
2/20	M	----	----	----
3/24	M	----	----	----
3/24	F	----	----	----
3/24	F	----	----	----
3/24	M	1040	965	800
3/24	F	1168	1040	748
4/25	F	----	----	----
4/27	F	----	----	----
4/28	F	1042	914	813
4/30	F	991	872	801
5/1	F	1105	1016	872
5/3	F	----	----	----
5/4	F	978	870	775
5/4	F	1017	1042	775
5/4	F	1043	1004	813
5/5	F	998	915	778
5/6	F	----	----	----
6/17-7/1	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
"	F	----	----	----
7/2	F	----	----	----
7/12	F	1143	1016	888
7/13	F	1067	914	838
7/14	F	1017	914	838
7/15	F	1042	800	788
7/17	F	1042	800	813
7/20	F	1054	965	851
7/21	F	1043	965	838
7/22	F	1168	1131	887
7/26	F	1067	1028	838
7/29*	F	1092	1016	839
8/5	F	1042	965	800
8/18**	F	1016	940	788

\* Tagged and released on 7/29, returned to nest on 8/13.  
 \*\* Tagged and released on 8/18 with tag # 1072-1073.

NOTE: All measurements are curve measurements, expressed in millimeters.



TABLE III

HATCHLING GROWTH

1. All measurements straight line expressed in millimeters.
2. Average sizes approximate.
3. Nest #2, all except one escaped from live car two days after hatching.
4. All hatchlings released August 28, 1972, except three, which were sent to Marine Resources Laboratory in Palau.
5. Nest #6 taken by ghost crabs.

DATE	CARAPACE LENGTH	CARAPACE WIDTH	PLASTRON LENGTH
<u>Nest #1, Largest:</u>			
July 12	48	41	39
August 1	63	54	50
August 8	68	56	56
August 15	70	60	57
August 22	79	64	64
Size at Release	84	67	66
<u>Nest #1, Smallest:</u>			
July 12	49	41	39
August 1	52	46	42
August 8	55	48	46
August 15	60	52	50
August 22	62	54	51
Size at Release	64	56	53
<u>Average Size at Release:</u>	78	66	63
<u>Nest #2:</u>			
July 27	51	38	38
August 3	52	41	45
August 10	55	46	46
August 17	59	48	48
August 24	65	52	52
Size at Release	67	54	54
<u>Nest #3, Largest:</u>			
July 30	50	40	39
August 6	53	42	44
August 13	59	49	49
August 20	64	53	53
August 27	71	59	58
Size at Release	71	59	58

NOTE: Table II continued next page.



TABLE II continued

DATE	CARAPACE LENGTH	CARAPACE WIDTH	PLASTRON LENGTH
<u>Nest #3, Smallest:</u>			
July 3	50	40	39
August 6	51	40	43
August 13	53	44	44
August 20	55	47	46
August 27	56	47	46
Size at Release	56	47	46
<u>Average Size at Release:</u>	67	56-57	56
<u>Nest #4, Largest:</u>			
August 2	48	40	41
August 9	53	41	43
August 16	58	50	48
August 23	62	55	51
Size at Release	65	58	58
<u>Nest #4, Smallest:</u>			
August 2	48	36	40
August 9	48	38	41
August 16	52	44	43
August 23	55	46	44
Size at Release	57	48	46
<u>Average Size at Release:</u>	58-60	50	46
<u>Nest #5, Largest:</u>			
August 5 (approx.)	50	41	40
August 12 (approx.)	53	48	45
August 19	62	48	52
August 26	67	54	56
<u>Nest #5, Smallest:</u>			
August 5	49	40	40
August 12	----	----	----
August 19	----	----	----
August 26	56	48	46
<u>Average Size at Release:</u>	60	50	49

NOTE: Table II continued next page.

TABLE II] continued

DATE	CARAPACE LENGTH	CARAPACE WIDTH	PLASTRON LENGTH
<u>Nest #7, Largest:</u>			
August 19	52	41	40
August 26	53	42	42
<u>Nest #7, Smallest:</u>			
August 19	---	---	---
August 26	49	37	40
<u>Average Size at Release:</u>	50-51	41	41

TABLE IV

CHRONOLOGY OF ACTIVITIES RELATING TO TURTLE SURVEY OF WEST FAYU, 1972

DATE	OCCURRENCE
July 7	Survey part arrived West Fayu aboard <u>James Cook</u> and set up camp. Tropical Storm Phyllis NE of Truk caused bad weather and hampered efforts to spot mating turtles in the lagoon.
July 8	Arrival of <u>M/T Stanford</u> and barge for de-fueling operations aboard <u>M/V Solar Trader</u> .
July 10	First two turtles nested.
July 11	Found a relatively old nest and surrounded it with chicken wire.
July 13	79 Hatchlings discovered within chicken wire enclosure and placed in live car.
July 16	Arrival of Lt. William Kay USN and Lt. R. Werner USCG to oversee de-fueling of <u>Solar Trader</u> .
July 17	Leak discovered in de-fueling pipeline and slick drifted towards the island. Quick action by salvage crew and placing of booms around island forced oil to disperse at sea.
July 22	Arrival of U.S. Navy plane to pick up Lt. Werner and bring various unsolicited supplies to turtle survey crew.
July 25	Fly-by of U.S. Navy plane dropped turtle tag applicators previously requested.
July 27	Nest #2: 21 hatchlings placed in live cars.
July 30	Nest #3: 37 hatchlings placed in live cars.
August 1	Large waves tipped live car #2, releasing all hatchlings from Nest #2 except 1.
August 2	Nest #4 discovered: 17 hatchlings placed in live cars.
August 4	Nest #5 discovered: 86 hatchlings placed in live cars.
August 11	Nest #6 discovered to have been taken by ghost crabs. Four live remaining hatchlings.

NOTE: TABLE IV continued next page.

TABLE IV continued

DATE	OCCURRENCE
August 12	Return of U.S. Navy plane with requested supplies of 1/2 inch wire mesh and speargun. Transported one hatchling back to Marine Laboratory at University of Guam for observation.
August 15	Visited by five canoes from Satawal. Stayed 36 hours, then returned to Satawal.
August 18	Nest #7 discovered: 28 hatchlings placed in live cars.
August 19	Captured mature female resting on bottom of lagoon approximately 1/4 mile NE of island. This was only turtle captured in the water during the duration of the survey.
August 21	Spotted one large turtle floating 300 yards offshore on ocean side of reef. This was only turtle spotted in water, as no mating turtles were spotted during survey.
August 28	Return of <u>James Cook</u> to transport survey crew back to Satawal. All hatchlings except 17 released at various spots on ocean side of reef. Remaining 17 transported to Satawal to continue raising and observation.