



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Fisheries Center
Honolulu Laboratory
P. O. Box 3830
Honolulu, Hawaii 96812

TO ALL BILLFISHERS:

A little over 18 years ago Peter Fithian introduced his baby, the Hawaiian International Billfish Tournament (HIBT). When HIBT was just a 3-year old infant the National Marine Fisheries Service (NMFS) began sending biologists to the tournament to collect data on billfishes and other game fishes. In the ensuing years as Papa Peter nurtured his child and guided its growth, NMFS took on the role of a close uncle. That is, NMFS visited regularly and provided interesting contributions to the child's growth in the form of demonstrations, workshops, lectures, projects, and exhibits on game fish oriented science without having to be responsible for its basic needs and survival. In this role NMFS also issues a report on the biological and statistical aspects of the tournament. This is the report of the Nineteenth HIBT.

The work accomplished by NMFS at the tournament was possible through the great cooperation and willingness of the tournament staff and officials, the anglers, and the volunteers from the community. As this year's NMFS representatives, Ray Sumida and I sincerely thank you for your assistance and support. In the past we have been remiss in our acknowledgments by not singling out Peter Fithian and James Sutherland who, despite overseeing the myriads of details which go into organizing the HIBT, have consistently planned for our presence so that our work at the tournament is facilitated long before the tournament even starts.

THE CATCH

Eighty-seven fish were caught in this year's tournament. This number does not include the fish that were disqualified because of rule infractions. The catch consisted of 71 blue marlin, 14 ahi (yellowfin tuna), 1 striped marlin, and 1 shortbill spearfish. As can be seen from Table 1 this year's catch rate (all species combined) was the same as last year's. This year's 71 blue marlin, however, amounted to 51% more than last year's. In fact, this catch of 71 blue marlin ranks fifth among blue marlin catches of all the tournaments held to date.

The weights of the blue marlin ranged from 133 to 683 lb and averaged 231.4 lb. The weights of the ahi ranged from 108 to 223-1/2 lb and averaged 177.7 lb. The single striped marlin weighed 102-1/2 lb and the shortbill spearfish tipped the scales at all of 7 lb.

SEX

Last year for the first time in the history of HIBT more female blue marlin than male blue marlin were caught. This year the males resumed their foolish ways. Of the 66 blue marlin we examined 41 were males and 25 were females, a male:female ratio of 1.6:1 (Table 2). The data of past years suggested a correlation between catch rate and the male to female ratio. Each year as we added another data point we would do a correlation analysis. The correlation was never statistically significant but always tantalizingly close. It turns out we were looking at the wrong variable. The catch rate of blue marlin during a tournament is strongly correlated to the number of males caught in the tournament (Figure 1) and independent of the number of females.

FISHING AREAS

The data for the detailed analyses for this section were obtained from your reports during the radio roundups. The most popular area was Tango which totaled 367 boat-hours. Other well fished areas in order of popularity were: Juliett (284 boat-hours), Sierra (269 boat-hours), Uniform B and Kilo (263 boat-hours each). Other areas with over a hundred boat-hours of fishing were: Uniform A, Lima, Victor, and India. The analyses were limited to these nine areas.

Area Victor had the best strike rate of 0.22 strike per boat-hour. Uniform B was second with 0.16 strike per boat-hour. Kilo and India had strike rates of 0.13 strike per boat-hour. Tango had the most strikes for the tournament but it also had the most fishing effort. This area ranked fifth in strike rate. The overall strike rate for all the areas was 0.13 strike per boat-hour. This is a shade better than last year's 0.11 and considerably less than the 0.20 average of the previous 4 years. Figure 2 categorizes the areas according to their strike rates.

Table 3 summarizes the catch by areas, species, and dates. Area Tango yielded 11 blue marlin to lead all areas. Areas Sierra and Kilo were next with 10 and 9 blue marlin, respectively. When fishing effort is taken into consideration, however, India ranked first followed closely by Sierra, Kilo, and Victor in that order. The areas with the best marlin weight production were: Sierra (11.3 lb/boat-hour), India (10.9 lb/boat-hour), Kilo (8.6 lb/boat-hour), and Tango (8.5 lb/boat hour).

Uniform B and A were the best ahi areas with four and three ahi, respectively.

TACKLE, TIME, AND TIDE

Lines of two strengths, 24-kg test and 36-kg test, were used this year. These lines are the metric equivalent to the 50-lb and 80-lb test lines. The number of fish caught on these lines were close; 41 fish on the 24-kg line and 46 fish on the 36-kg line. A total of 8,439 lb was landed on the 24-kg line as compared to 11,692.5 lb on the 36-kg line. Translated into tournament points, the weight caught on the 24-kg line including its 50% bonus accounted for 966 points more than the catch on the 36-kg line.

There were 182 hook-ups in the tournament. Forty-eight percent of these resulted in the landing of a fish. A common question asked of us is, "What is the difference in losses of hook-ups between the two line strengths?" We don't have the answer to that because we only have line strength information of the fish that are landed. An analysis of the weights of blue marlin caught on these lines (Figure 3) is somewhat related to the question. Of marlins less than 200 lb, 22 were caught on 24-kg test line and 13 on 36-kg test. Of marlins between 200 and 500 lb, 10 were caught on 24-kg test line and 24 on 36-kg test. The two marlin over 500 lb were caught one on each type of line.

The best hour for catching blue marlin was 11 a.m. to noon (Figure 4). This is the third consecutive year that this hour has been the most productive in blue marlin. I have not investigated the hour of capture previous to HIBT 1975.

In Figure 5 the strike rates of each of the radio roundup periods for each day are superimposed on the tide chart. On the first 2 days of the tournament the best strike rates occurred on the rising tide. On the last 3 days the best strike rates occurred at low tide. On the last 3 days the low tide period coincided with the 11 a.m. to noon hour. You are invited to make your own interpretations of the facts.

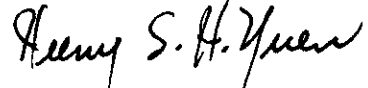
MARLIN DIET

A list of the items found in the blue marlin stomachs (Table 4) contains 15 different fish families and squid. As usual members of the tuna family were the favorite items. They occurred in 69% of the stomachs examined.

Perhaps more interesting are the unusual facts about this year's stomach contents. Mahimahi were found in about twice as many stomachs than in the past. Three families of fish which had never occurred in HIBT marlin stomachs before were in this year's stomachs. These are the sand lance, snipe eel, and nehu. A flying gurnard showed up after an absence of 7 years and a goatfish after 4 years. The most unusual item was a tip of a marlin bill.

Until we meet again at the Twentieth Hawaiian International Billfish
Tournament,

Aloha,



Heeny S. H. Yuen
Leader, Recreational Fisheries

Attachments

October 31, 1977

Table 1.--Numbers of qualifying game fish landed and teams fishing during Hawaiian International Billfish Tournaments, 1962-77.

Year	Blue marlin	Black marlin	Striped marlin	Shortbill spearfish	Sailfish	Yellowfin tuna >100 lb	Total qualifying fish	Number of teams	Number of boat-days fishing per fish ¹
1962	30	1	--	--	1	19	51	68	6.7
1963	19	2	1	--	--	26	48	72	7.5
1964	31	--	1	--	--	2	34	69	10.1
1965	47	--	--	--	--	9	56	78	6.9
1966	26	3	2	--	--	7	38	72	9.5
1967	63	--	1	--	--	18	82	68	4.2
1968	36	2	4	--	--	4	46	85	9.2
1969	32	1	--	--	--	4	37	75	10.1
1970	91	--	2	--	2	14	109	73	3.3
1971	41	--	3	1	--	47	92	77	3.4
1972	77	--	--	--	--	11	88	59	3.4
1973	76	--	1	3	1	17	98	61	3.1
1974	66	2	1	6	--	37	110	64	2.9
1975	104	--	2	8	--	79	193	79	2.0
1976	47	1	3	5	--	32	88	74	4.2
1977	71	--	1	1	--	14	87	73	4.2

¹Nine-hour fishing days, 1962-73; 8-h days, 1974-77.

Table 2.--Sex ratios for blue marlin examined from
Hawaiian International Billfish Tournaments, 1962-77.

Year	Number of males	Number of females	Ratio males to females
1962	16	7	2.3:1
1963	13	6	2.2:1
1964	14	12	1.2:1
1965	35	8	4.4:1
1966	16	8	2.0:1
1967	51	13	3.9:1
1968	24	10	2.4:1
1969	23	8	2.9:1
1970	63	14	4.5:1
1971	21	9	2.3:1
1972	64	8	8.0:1
1973	47	21	2.2:1
1974	46	14	3.3:1
1975	70	16	4.4:1
1976	7	37	0.2:1
1977	41	25	1.6:1

Table 3.--Number of fish caught by species, date, and area, Hawaiian International Billfish Tournament, 1977.

Date, 1977	Area												
	B	C	D	I	J	K	L	M	S	T	U/A	U/B	V
Blue marlin													
August 15	--	--	1	3	1	2	--	1	3	3	1	1	--
16	--	--	--	--	2	2	1	--	--	1	2	--	--
17	--	2	--	2	1	3	1	1	2	4	1	1	4
18	--	--	--	1	1	1	1	--	4	--	3	5	1
19	--	--	--	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	--	<u>1</u>	<u>3</u>	--	--	--
Sum		2	1	7	6	9	4	2	10	11	7	7	5
Average weight (lb)		133.8	421.5	212.6	184.7	249.8	194.5	174.0	305.3	282.1	180.6	265.9	290.4
Ahi													
August 15	--	--	--	--	--	--	--	--	--	--	2	1	--
16	--	--	--	--	--	--	--	--	--	1	--	--	--
17	2	--	--	--	--	--	2	--	--	--	--	--	--
18	--	--	--	--	--	--	--	--	--	--	1	3	--
19	--	--	--	--	--	<u>1</u>	--	--	--	<u>1</u>	--	--	--
Sum	2					1	2			2	3	4	
Average weight (lb)	131.0					200.5	190.8			206.0	197.5	167.9	
Striped marlin													
August 15	--	--	--	--	<u>1</u>	--	--	--	--	--	--	--	--
Weight (lb)					102.5								
Shortbill spearfish													
August 16	--	--	--	--	--	--	--	--	--	--	--	--	<u>1</u>
Weight (lb)													7.0

7

Table 4.--Stomach contents of blue marlin,
Hawaiian International Billfish Tournament, 1977

Food items	Date and number of stomachs containing listed food items					Percent occurrence
	August					
	15	16	17	18	19	
<u>Fish</u>						
Tunas and mackerels, Scombridae	10	6	14	11	3	69
Skipjack tuna, <u>Katsuwonus pelamis</u>	7	3	5	5	3	36
Kawakawa, <u>Euthynnus affinis</u>	--	1	--	--	--	2
Frigate mackerel, <u>Auxis</u> sp.	2	2	3	4	--	28
Unidentified tuna	5	3	7	11	--	41
Opelu, Carangidae	5	3	5	2	3	28
Mahimahi, Coryphaenidae	1	2	3	2	--	13
Triggerfish, Balistidae	1	2	2	4	--	14
Pelagic spiny puffer, Diodontidae	5	--	1	2	1	14
Butterflyfish, Chaetodontidae	--	--	1	1	--	3
Surgeonfish, Acanthuridae	--	--	1	--	--	2
Aweoweo, Priacanthidae	--	--	1	--	--	2
Goatfish, Mullidae	--	1	--	--	--	2
Nehu, Engraulidae	--	1	--	--	--	2
Flying gurnard, Dactylopteridae	1	--	--	--	--	2
Snake mackerel, Gempylidae	1	1	1	1	--	6
Snipe eel, Nemechthyidae	--	1	--	--	--	2
Bonnetmouth, Emmelichthyidae	--	2	--	--	--	3
Sand lance, Ammodytidae	--	--	1	--	--	2
Unidentified fish	4	4	6	2	1	27
<u>Invertebrates</u>						
Squid, Decapoda	4	2	5	--	--	17
Empty or everted stomachs	2	--	1	3	1	11
Number of stomachs examined	12	9	21	15	7	
Total:	64					

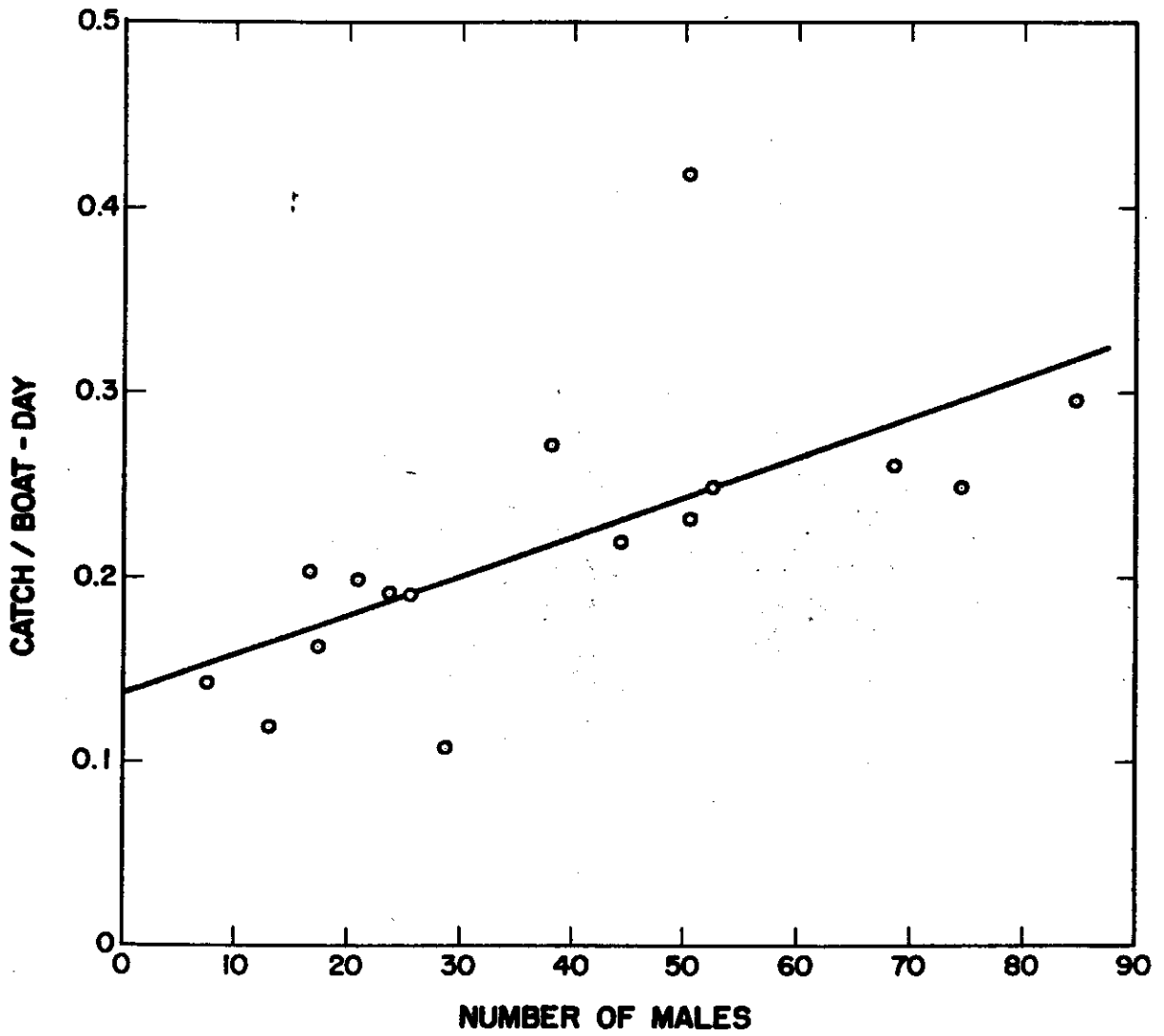


Figure 1.--The relationship of the catch rate of blue marlin to the number of males caught.

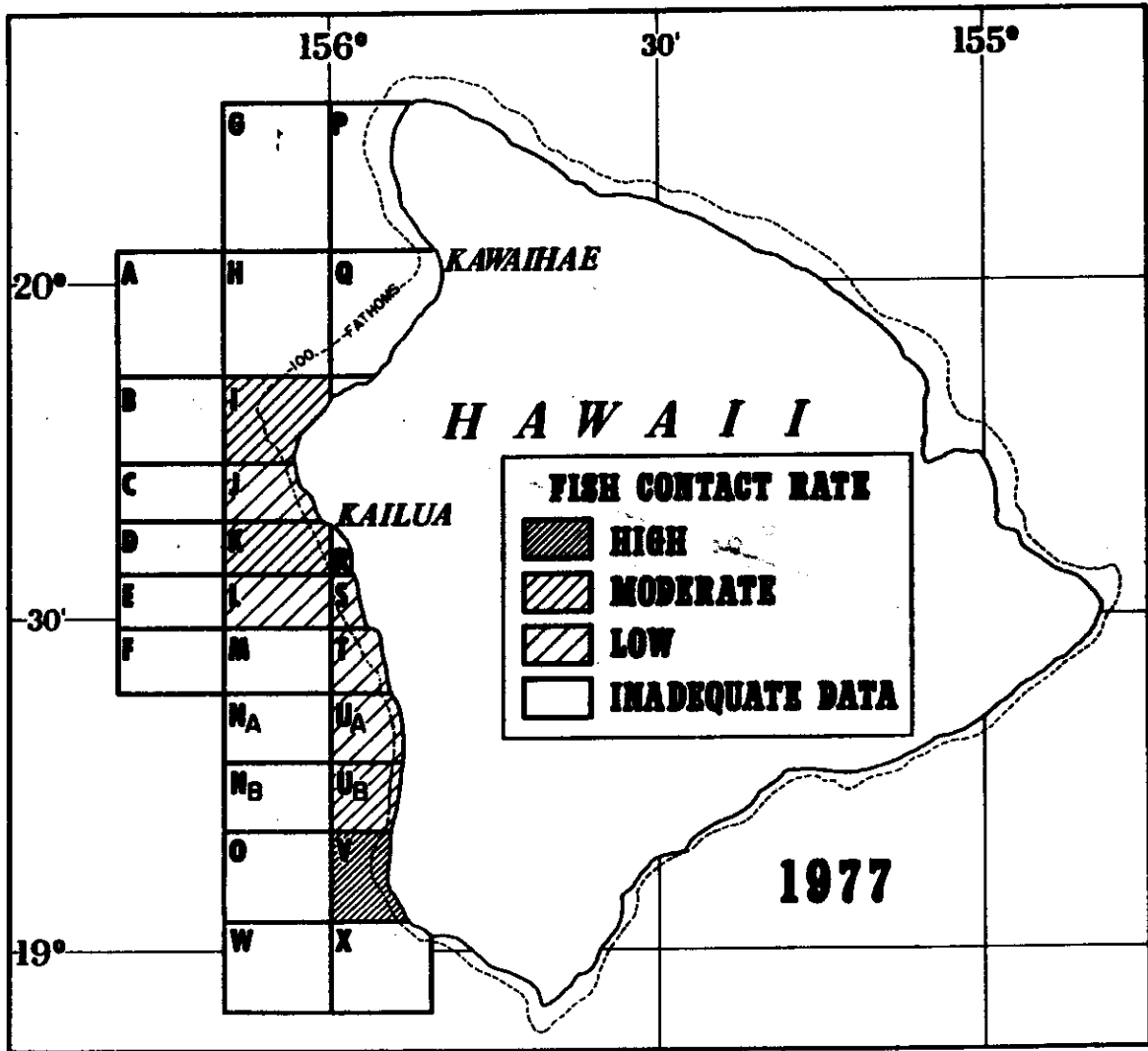


Figure 2.--Strike rate in various fishing areas.

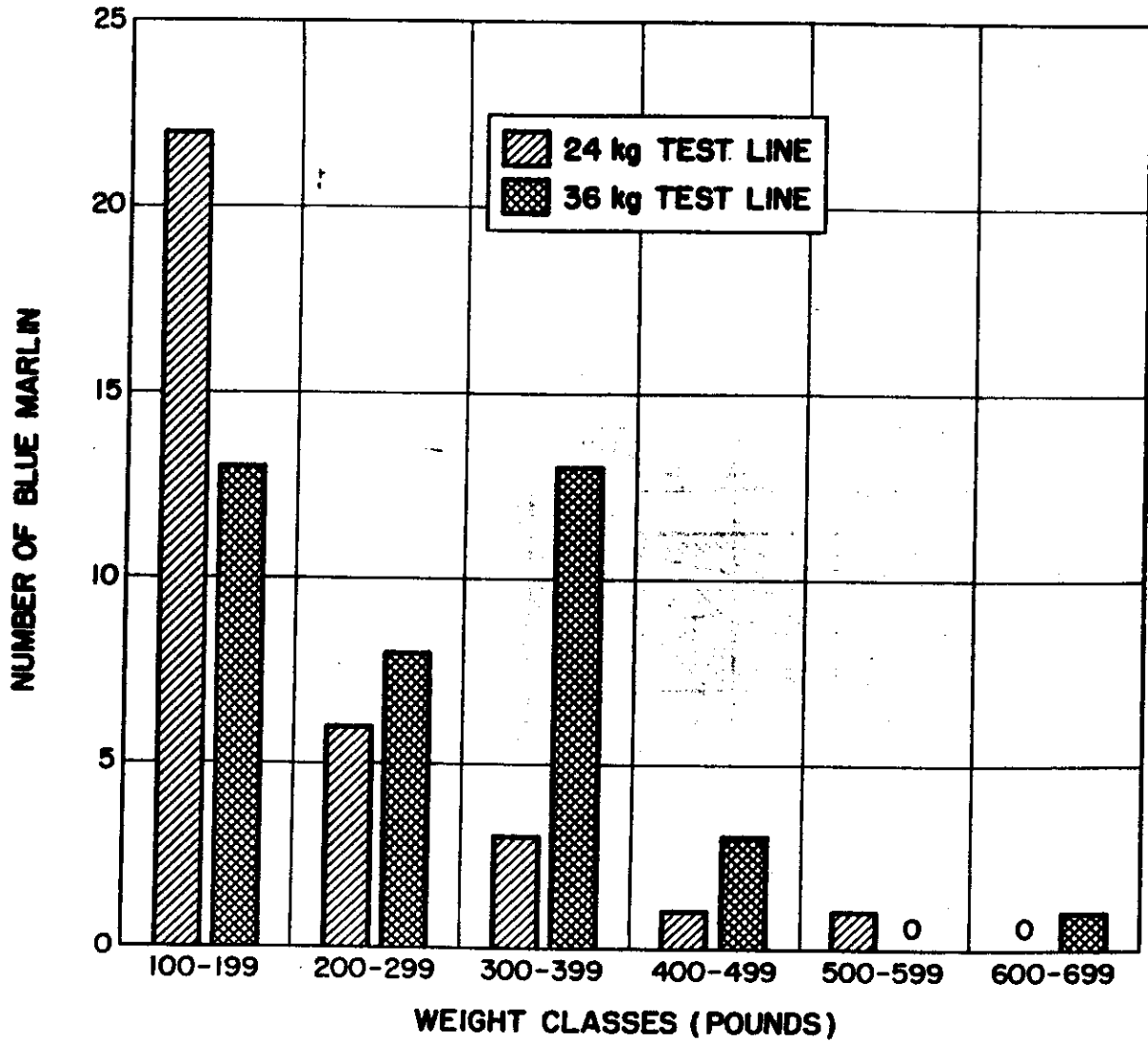


Figure 3.—Weights of blue marlin caught on 24- and 36-kg test lines.

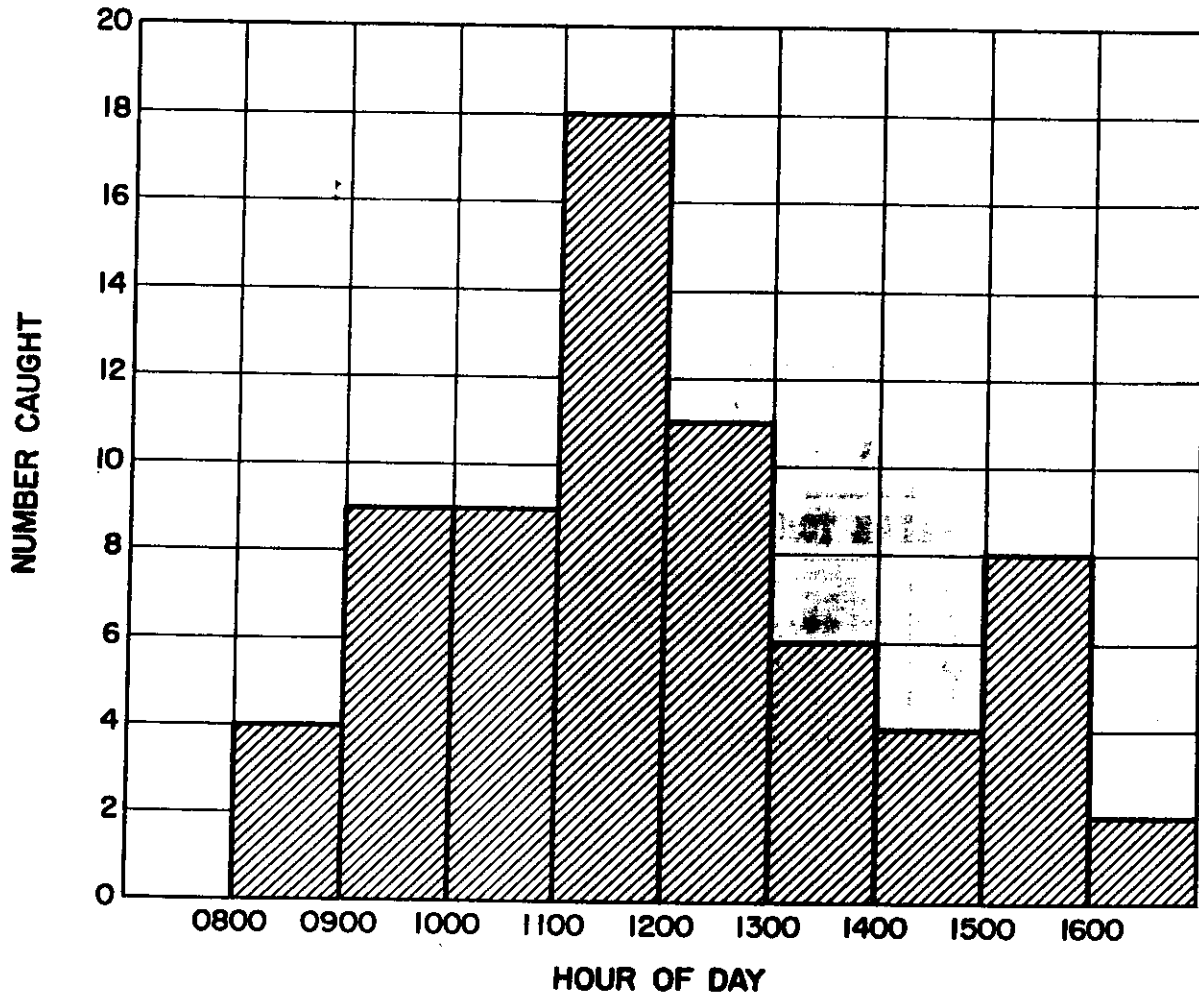


Figure 4.--Number of blue marlin caught at various hours of the day.

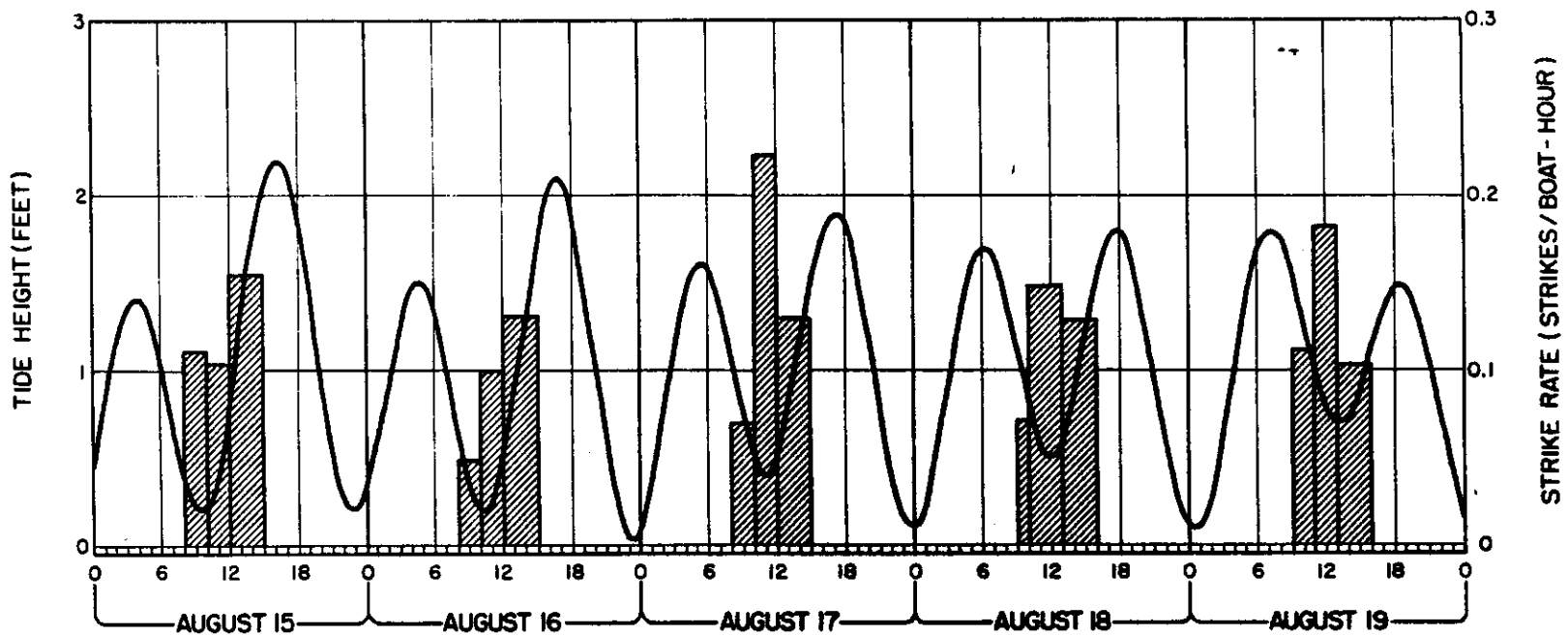


Figure 5.--Strike rates and tide cycle, HIBT 1977.