

FISHING SKIPJACK TUNA WITH NORTHERN ANCHOVY  
IN HAWAIIAN WATERS, JULY 20-22, 1976

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## BAIT DISTRIBUTION

The Pacific Trojan arrived at Kewalo Basin, Honolulu, at 1500 h on July 19, 1976 and started distributing the northern anchovy, Engraulis mordax, soon thereafter to the boats fishing for skipjack tuna, Katsuwonus pelamis, or aku boats, as they are called locally, according to a schedule established by drawing lots among the captains. The total amounts received by each of the nine boats that eventually picked up anchovy are shown in the report from Mr. Stanley D. Smith to the Director, Honolulu Laboratory, dated July 23, 1976. The first two boats that picked up bait fared better than the remaining boats. Some captains, who received bait after the second boat was loaded, complained about the "light" buckets of anchovy they received. One in particular estimated that his boat actually received only one-half of what was supposedly loaded on his boat because of the use of a "light" bucket of bait during transfer. Among the 12 Oahu-based aku boats that were originally scheduled to pick up anchovy, only 9 eventually showed up for the bait. After the second boat was loaded, one captain refused the anchovy after learning that the number of buckets of bait to be distributed would be reduced to 20 buckets. The other two simply decided to pass up the anchovy and continue fishing with nehu, Stolephorus purpureus, the locally available baitfish.

## VESSELS SELECTED FOR OBSERVATION

Industry was strongly in favor of splitting the imported anchovy evenly among the 12 aku boats rather than follow a prescribed plan in which four vessels, selected on the basis of their past performance, would receive a minimum of two full loads of anchovy for field testing. Despite the abandonment of the prescribed plan, the Honolulu Laboratory was able to place observers on five aku boats to collect field data. Of the five boats that participated, three were among the top producers in recent years. Industry argued, and we agreed, that for this initial shipment it would be highly desirable to give as many of the vessels as possible a chance to use anchovy for fishing so that each may decide, on its own, whether future shipments would be desirable.

## OBSERVATIONS AT SEA AND INTERVIEWS

The five observers collected data from a total of eight trips on which fishing was attempted with anchovy. For each school, the observers recorded the time of sighting, the start of chumming, and the start and end of fishing. They estimated the amount of bait used per school, counted the number of men that actually fished, recorded the species caught, estimated the average size of the fish in the school from a small sample selected at random, and noted the reason for abandoning a school after chumming it unsuccessfully or after having successfully fished it.

To obtain information from those boats that did not have observers aboard, interviews were held with the boat captains as the boats returned from a day's fishing with anchovy. Among the data collected through interviews were the number of schools chummed during the day, the number of schools successfully fished, amount of bait used for the trip, the species of fish caught, the estimated amount caught, and a personal appraisal of the effectiveness of anchovy in stopping a school and also in holding a school at the stern for effective fishing.

#### FISHING RESULTS

During the eight trips by the five aku boats with observers, a total of 35 schools were sighted of which 21 were chummed with anchovy and 1 was chummed with a combination of nehu and anchovy. Table 1, which gives the results of those schools that were chummed and also those that were successfully fished, shows the amount of time each school was chummed and the time spent fishing it, the species and amount of bait used, the catch in pounds, and the reason for abandoning the school.

Unfortunately, the data collected are insufficient for any kind of meaningful statistical analysis. In general, the boats that fished with anchovy did very poorly compared to those that fished with a mixture of nehu-anchovy and all nehu. Data in Table 1 reveal that of 21 schools chummed with anchovy, only 7 or 33% were successfully

fished whereas the usual rate of success with nehu is about 50%. With 55 buckets of anchovy used to produce a catch (all species) of 12,583 lb, the catch per bucket of anchovy amounted to 229 lb. The average catch from those schools that yielded fish amounted to 1,798 lb, but based on all schools chummed including those with zero catches, the catch per school amounted to only 600 lb.

By way of a crude comparison, the total catches produced by the fleet, the number of trips involved, and the catch per trip for the period July 20-22 were segregated by type of bait in Table 2. For all boats using only anchovy, the total catch reached 25,874 lb with catch per trip amounting to 1,990 lb on 13 trips. There were three trips with anchovy-nehu used for fishing and these appeared to be quite productive--the catch totaled 19,854 lb and averaged 6,618 lb per trip. Those boats that used only nehu produced 25,518 lb on five trips or 5,104 lb per trip.

Several reasons have been heard for the poor showing of anchovy. These are:

1. "Season" aku, those fish ranging from 15 to 22 lb and which annually constitute the bulk of the catch, were noticeably scarce. The cannery records for the period July 20-22 show that small fish predominated in the catch--6.1% of the landings were extra-small aku (less than 4 lb), 69.7% were small aku (4-8 lb), 1.0% was medium aku (8-15 lb), and only 23.2% were large fish (more than 15 lb). Therefore, most of the fishing with anchovy was on schools of small aku.

2. Because anchovy are larger than nehu, the count or number of individual fish per bucket was considerably less than the number of individuals in a bucket of nehu. Likewise, in chumming, whereas only a few pieces of anchovy can actually be held in each handful or netful to be cast into the water, with nehu considerably more individuals can be held in each handful or netful. The result is that an aku school being chummed with anchovy consumes the few pieces quickly then sounds. With nehu as chum, hundreds of individual fish are cast into the water thus keeping the aku feeding longer at the surface.

3. Some of the anchovy were too large and tended to sound when cast into the water, taking the aku school down with them. On one boat, for example, aku were observed feeding on the larger anchovy several feet below the surface.

4. A mixture of nehu and anchovy may work well if nehu is used to bring the school close to the stern of the boat and anchovy used to hold it there.

Anchovy are strong and survive rough seas, handling, and low oxygen quite well. These desirable characteristics will permit the boats to venture quite far from Kewalo Basin. At present, because of heavy nehu mortalities, many captains are unwilling to risk a trip that would take them far from Pearl Harbor and Kaneohe, the two most productive baiting grounds in the Hawaiian Islands.

Table 1.--Results of fishing with anchovy and anchovy-nehu by five aku boats in the Hawaiian skipjack tuna fishing fleet, July 20-22, 1976.

Time per school		Bait used		Skipjack tuna		Yellowfin tuna		Mahimahi		Others		Total		Reason school abandoned	
Chumming	Fishing	Species	Amount	Lb	tuna	Lb	tuna	Lb		Lb		Lb			
Min	Min		Bkt.												
29	--	Anchovy	0.75	--	--	--	--	--	--	--	--	--	--	--	Sounded
15	--	Anchovy	0.75	--	--	--	--	--	--	--	--	--	--	--	Sounded
37	--	Anchovy	0.75	--	--	--	--	--	--	--	--	--	--	--	Sounded
11	--	Anchovy	0.75	--	--	--	--	--	--	--	--	--	--	--	No response
10	--	Anchovy	0.75	--	--	--	--	--	--	--	--	--	--	--	Large yellowfin
3	98	Anchovy	28.00	5,460	654	95	6,209								Sounded
45	--	Anchovy	5.00	--	--	--	--	--	--	--	--	--	--	--	No response
8	8	Anchovy	5.00	233	--	--	233								Biting stopped
6	5	Anchovy	3.00	18	--	--	18								Biting stopped
5	--	Anchovy	0.20	--	--	--	--	--	--	--	--	--	--	--	No response
1	--	Anchovy	0.10	--	--	--	--	--	--	--	--	--	--	--	No response
8	--	Anchovy	0.20	--	--	--	--	--	--	--	--	--	--	--	Sounded
44	--	Anchovy	0.10	--	--	--	--	--	--	--	--	--	--	--	No response
5	--	Anchovy	0.10	--	--	--	--	--	--	--	--	--	--	--	No response
180	25	Anchovy	6.00	1,357	--	--	1,357								Biting stopped
1	2	Anchovy	2.00	--	--	--	--	399							Biting stopped
1	11	Anchovy	1.00	--	--	--	--	24							Biting stopped
1	98	Anchovy	11.00	4,343	--	--	--	--							No bait left
93	--	Anchovy	3.00	--	--	--	--	--							No response
90	--	Anchovy	3.00	--	--	--	--	--							No response
28	--	Anchovy	4.00	--	--	--	--	--							No response
17	557	Anchovy-nehu	<sup>1</sup> 6.00 <sup>2</sup> 24.00	15,227	--	--	15,227	177							No bait left

<sup>1</sup>Anchovy

<sup>2</sup>Nehu

Table 2.--Results of fishing with anchovy, anchovy-nehu, and nehu by some of the Hawaiian skipjack tuna fishing boats, July 20-22, 1976.

Type of bait used	Catch	Trips	Catch per trip
	<u>Lb</u>	<u>No.</u>	<u>Lb</u>
Anchovy	25,874	13	1,990
Anchovy-nehu	19,854	3	6,618
Nehu	25,518	5	5,104

<sup>1</sup>All species including 656 lb of yellowfin tuna, 177 lb of kawakawa, and 494 lb of mahimahi.