

Expansion has marked the new skipjack tuna fishery of Papua New Guinea.

Skipjack Tuna Fishing in Papua New Guinea, 1970-73

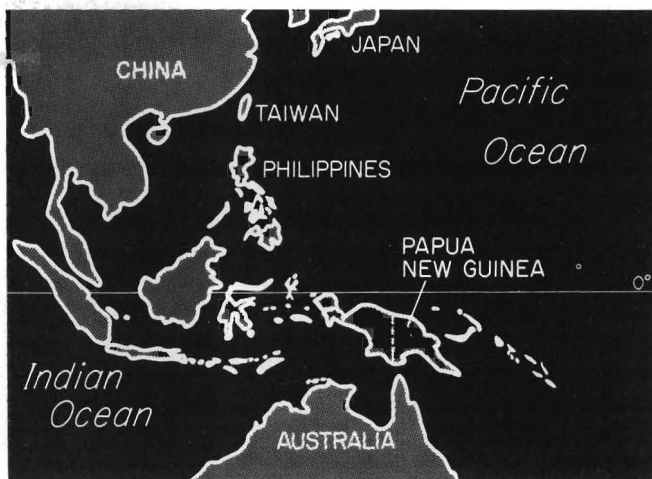
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INTRODUCTION

The live bait and pole fishery for skipjack tuna (*Katsuwonus pelamis*) in the southwestern Pacific Ocean has in recent years been one of the world's most rapidly expanding pelagic fisheries¹. Expansion of this fishery has been most marked in the waters surrounding Papua New Guinea where, although prior to 1970 there was no commercial exploitation of the species, the catch landed by locally-registered pole vessels in 1973 was approximately 28,300 metric tons (mt).

Papua New Guinea has little history of skipjack fishing and the lack of suitable, locally-owned vessels meant that foreign fishing companies were required to survey the resources and commence commercial exploitation

¹See also "Japan's Skipjack Fishery Develops in South Pacific," Foreign Fishery Developments, page 42, this issue.



of existing stocks. Since the commencement of survey fishing the number of joint venture companies has risen to four and expansion of the total fleet continues; the annual catch has exceeded that of the preceding year in three of the four years of fishing, 1972 being the exception. As almost the entire catch has been taken by live bait and pole vessels the bait fishery has assumed great importance.

THE COMPANIES AND VESSELS

In March 1970 Gollin Kyokuyo (Niugini) Pty. Ltd., a joint Japanese-Australian company (Table 1) commenced survey fishing for skipjack in Papua New Guinea using the port of Kavieng as its home base. During 1970 only the single company was operating and the fleet consisted of a single mother ship and a maximum of

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four catcher boats in the 18- to 21-m class. Since the beginning of 1971 three additional companies (Table 1) have commenced fishing based in the ports of Rabaul and Madang and the number of catcher boats reached a high of 33 in June 1973. All operations to date have been based on the use of motherships: none of the companies relies on unloading fish at a permanent shore-based installation although company A does unload some fish to the katsuobushi plant at Kavieng.

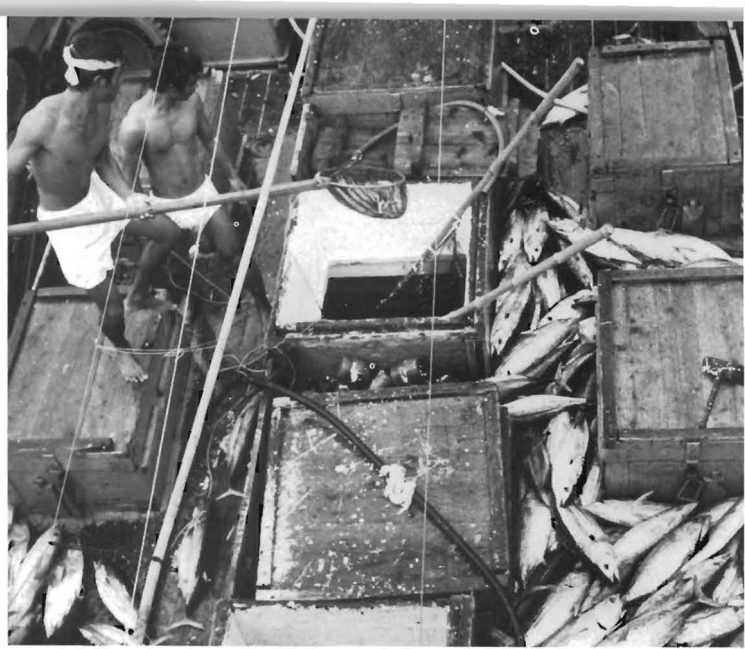
Table 1.—Composition of the four companies fishing for skipjack tuna in Papua New Guinea to the end of 1973.

| Company | Percent composition ¹ |
|---|---|
| (A) Gollin Kyokuyo (Niugini) Pty. Ltd. | 55.0 Kyokuyo Co. Ltd. 45.0 Gollin Investment Pty. Ltd. |
| (B) Carpenter Kaigai (Papua New Guinea) Pty. Ltd. | 75.0 Kaigai Gyogyo K.K. 25.0 W.R. Carpenter (P.N.G.) Ltd. |
| (C) New Guinea Marine Products Pty. Ltd. | 44.5 Hokoku Marine Products Co. Ltd. 33.3 Nippon Suisan Kaisha Ltd. 22.2 C. Itoh and Co. Ltd. |
| (D) Star-Kist Papua New Guinea Pty. Ltd. | 100.0 Star-Kist Food Incorporated (California) |

¹Under the terms of the fishing agreements signed with each of the companies the Papua New Guinea Government reserves the right to take up a 20 percent equity in each company.

Figure 1.—A skipjack catcher boat typical of those used in Papua New Guinea. Photo courtesy of the Department of Information and Extension Services, Papua New Guinea.





Scenes of skipjack and skipjack fishing out of Papua New Guinea. Photos courtesy of the Department of Information and Extension Services, Papua New Guinea.



Table 2.—Positions of the exclusive bait fishing zones of each company.

| Company | Exclusive Bait Fishing Area(s) | |
|---------|--------------------------------|--|
| A | 20 mile radius from | S 02°17'48" E 150°28'36" |
| B | 20 mile radius from | S 04°15'13" E 151°46'03" |
| C | 10 mile radius from | S 05°10'00" and E 145°50'00" |
| D | 10 mile radius from | S 05°33'30" E 149°14'30" |
| | 10 mile radius from | S 05°25'00" E 150°06'00" and S 05°21'30" E 150°54'00" |

The fishing effort of each of the four companies has been generally concentrated within a 90-mile radius of the six restricted baitfishing areas (see under Bait Fishery). The localities of the major fishing areas can be approximated since 80.2 percent of the fish have been realized from bait caught in areas A and B (Table 2).

Since fishing commenced in 1970, 63 different live bait and pole boats have been registered for some period in Papua New Guinea. Of these, 60 were the common Japanese-type live bait and pole vessels (Fig. 1) of various sizes, two were Australian vessels normally employed in the southern bluefin tuna (*Thunnus maccoyii*) fishery off the southern coast of Australia and one was an American skipjack and yellowfin pole boat from California. Vessels of the Japanese design proved to be by far the most successful with those in the 21- to 28-m class being the most economical. The Japanese-designed vessels are crewed in the main by Okinawan fishermen but the number of Papua New Guineans in the crews, while still small, is increasing.

Table 3.—Annual catch and species composition of landing by live bait and pole boats in Papua New Guinea to the end of 1973. All figures are in metric tons.

| | 1970 | | 1971 | | 1972 | | 1973 | |
|-----------------------|-------|--------------|--------|--------------|--------|--------------|--------|--------------|
| | Total | Avg/Boat Day | Total | Avg/Boat Day | Total | Avg/Boat Day | Total | Avg/Boat Day |
| Jan | — | — | 918 | 3.54 | 681 | 1.75 | 411 | 1.13 |
| Feb | — | — | 992 | 3.49 | 744 | 2.09 | 294 | 1.02 |
| Mar | 307 | 3.74 | 1,461 | 4.40 | 1,359 | 2.69 | 678 | 1.66 |
| Apr | 348 | 4.70 | 1,512 | 4.27 | 966 | 2.51 | 839 | 1.48 |
| May | 370 | 4.51 | 1,884 | 5.51 | 1,633 | 2.78 | 2,906 | 3.58 |
| Jun | 441 | 5.44 | 2,039 | 6.43 | 793 | 1.69 | 3,011 | 3.67 |
| Jul | 480 | 6.40 | 1,952 | 5.52 | 846 | 2.17 | 4,038 | 4.50 |
| Aug | 113 | 4.03 | 2,027 | 4.23 | 748 | 2.24 | 4,373 | 4.70 |
| Sep | — | — | 1,490 | 3.55 | 345 | 1.36 | 4,719 | 5.26 |
| Oct | — | — | 1,065 | 3.78 | 1,336 | 3.42 | 1,782 | 2.85 |
| Nov | 145 | 4.54 | 962 | 2.86 | 2,243 | 5.11 | 2,571 | 4.53 |
| Dec | 226 | 3.97 | 700 | 2.33 | 1,430 | 3.44 | 2,647 | 5.14 |
| Total | 2,430 | 4.76 | 17,002 | 4.19 | 13,124 | 2.67 | 28,269 | 3.68 |
| Percent skipjack | 96.8 | | 99.0 | | 86.5 | | 94.4 | |
| Percent yellowfin | 3.1 | | 0.8 | | 12.5 | | 4.6 | |
| Percent other Species | 0.1 | | 0.2 | | 1.0 | | 1.0 | |

A single Japanese purse-seine vessel of 46.3 m fished in Papua New Guinea waters from November 1972 until the end of February 1973 and took a total of 335 tons of fish, of which 76 tons were skipjack (the remainder was mainly yellowfin (*T. albacares*) and bigeye (*T. obesus*) tuna). Admittedly, for a boat of this type this catch was small but bearing in mind that the catch by pole boats was abnormally low during this period further experimentation with purse seining in the western equatorial Pacific is definitely warranted.

THE CATCH

In order to maintain uniformity in the data, catches by the single purse seine and longline vessels have not been included in Table 3. All figures given in this table are taken from the daily catch returns completed by the various fishing companies.

Although skipjack is the target species for live bait and pole fishing and represents the greater proportion of the catch (Table 3), several thousand metric tons of juvenile yellowfin tuna have been taken since fishing commenced. The actual percentage of the catch which was yellowfin tuna has varied considerably from year to year, with 1972 (the worst year for skipjack) being unusually high. During 1970 when only one company was in operation catches appear to have been accurately declared according to species; however, since 1971 inaccurate declarations of the species composition of the catch on the part of one company have meant that estimates

based on the figures for total catch and percentage composition of the catch recorded by the other companies have had to be made. Estimates on an annual basis are given in Table 3. Small quantities of black skipjack (*Euthynnus affinis*) and frigate mackerel (*Auxis thazard*) have also been taken but these have not been sufficient to warrant separate analysis. Black skipjack and frigate mackerel represent almost 100 percent of the "other species" category in Table 3 but the combined catches of both species did not exceed 300 mt in any one year.

None of the catch taken by joint venture fishing has been sold for consumption as fresh fish in Papua New Guinea; the greater part has been exported in the frozen round as outlined in Table 4. An estimated 3.3 percent

Table 4.—Disposal of catch by country of destination to the end of May 1973 (all figures are in metric tons).

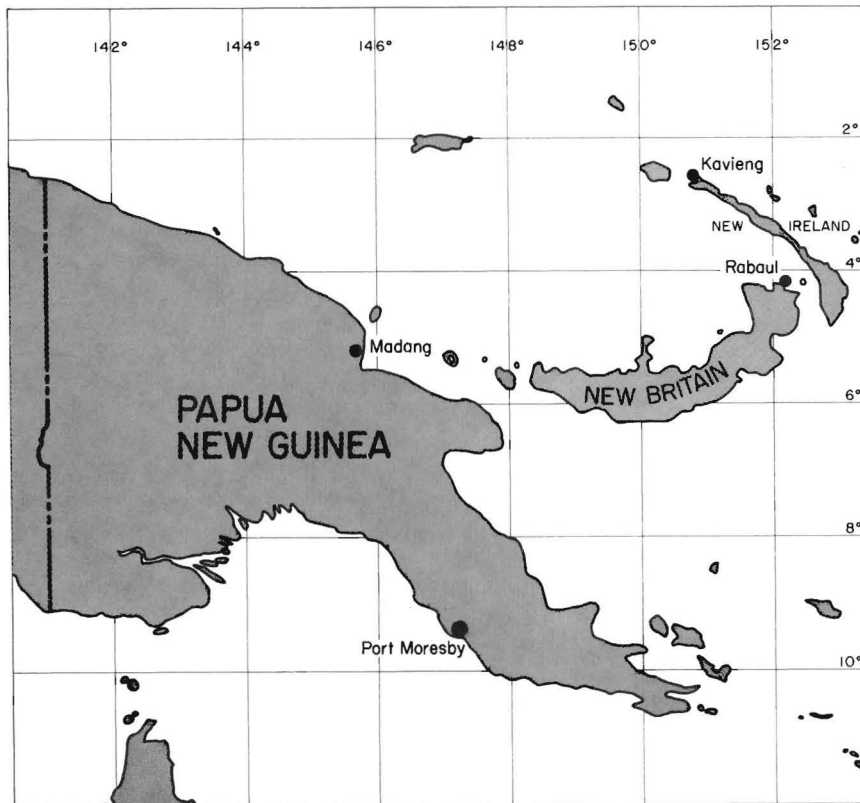
| | 1970-71 | 1971-72 | 1972-73 (May) | Percent age of total |
|--|---------|----------|---------------|----------------------|
| Japan | 8,998.4 | 12,376.6 | 7,439.5 | 85.31 |
| United States American Samoa | — | 1,821.5 | 470.9 | 6.79 |
| Australia | 2.3 | — | — | 0.01 |
| Processed in Papua New Guinea ¹ | — | 679.1 | 448.0 | 3.33 |
| Total | 9,000.7 | 15,149.5 | 9,629.4 | 100 |

¹This fish was processed in the katsuobushi plant at Kavieng and then exported to Japan. All figures for the quantities processed by this plant are based on a 20 percent return on fresh fish.

of the catch prior to June 1973 was processed in the katsuobushi plant at Kavieng and then exported to Japan. This estimate was arrived at using the factory manager's assertion that the weight of katsuobushi produced by the plant was 20 percent of the weight of whole skipjack processed.

The total catch to the end of April 1973 was 34,777 mt, and that actually exported to the end of May of the same year was 33,779. This difference of almost 1,000 mt could be accounted for by the quantity of fish held on motherships awaiting export and the amount attributed to freezer loss.

While the katsuobushi plant at Kavieng is the only skipjack processing plant in operation in Papua New Guinea at present, a substantial canning complex was planned for construction commencing in 1974. In the



Papua New Guinea, showing areas mentioned in the text.

latter part of 1972 all four joint venture fishing companies agreed to the formation of the Papua New Guinea Canning Company, which is a consortium of the four companies. A report of a feasibility study carried out by the Canning Company is at present (September 1974) being considered but Government approval has already been given for the establishment of a fish canning complex at Madang. The size and proposed daily output of the cannery have not yet been established but under the terms of the original fisheries agreements each of the companies has agreed that 50 percent of the catch should be "processed" in Papua New Guinea by the end of 1977. The remainder of the catch will continue to be exported in the frozen round.

THE BAIT FISHERY

Initially in their baitfish surveys the pioneer companies used "drive-in" techniques and daylight baiting operations. In May 1971 the potential for attracting suitable baitfish to bright lights was realized and since this time all pole boats registered in Papua New

Guinea have relied exclusively on night baiting with underwater lights and stick-held dip nets.

While some bait has been found in almost all harbors and anchorages on the periphery of the fishing areas, there is only a limited number of locations in which sufficient bait can be taken to regularly supply a fleet of the size operated by the joint venture companies. The best baitfishing areas investigated to date are those currently being fished by companies A and B (Table 2); however, areas which will support one or two catcher boats are very numerous.

Stolephorus anchovies have proven to be the most abundant bait species, but while they are excellent for attracting skipjack when broadcast from a boat, their value as a baitfish is restricted to some extent by their poor keeping qualities when being transferred into, and held in bait tanks in the catcher vessels. The fragility of the most common bait species means

that baiting operations must be carried out each night. This coupled with the lack of refrigeration on most catcher boats has limited the range of most vessels to within approximately 60 miles of the baiting grounds. Each fleet has one or two larger refrigerated vessels which occasionally venture farther afield. Using the argument that overexploitation of existing bait resources was possible, each of the four fishing companies has applied for, and been granted, an area (20 mile radius) of coastline for its exclusive use as a baitfishing zone (Table 2).

While there have been times when sufficient bait could not be obtained (particularly during periods of full moon) and the lack of an abundant, hardy bait species hampered long range operations, all companies agree that the general availability of bait has normally been adequate for their needs. In so far as the experience gained in three years enables a prediction, it would appear that the known baitfishing grounds are in no immediate danger of being overfished and there are numerous other areas which could be developed as at least supplementary sources of bait. Indeed the bait resources should be sufficient to support considerable expansion of the live bait and pole fishery.

POSSIBLE FUTURE DEVELOPMENT

In three of the four years of skipjack fishing in Papua New Guinea the catches have been more than adequate to support a sizeable industry. Even though 1972 was a comparatively poor year, the future of the industry appears assured; the years 1970, 1971, and 1973 all saw catches well above the minimum limits for economic operation. It is anticipated that a better understanding of the seasonal migratory patterns of skipjack, coupled with improved techniques for bait capture and handling, will result in more consistent, and increased, catches in future years. The establishment of a sizeable canning complex at Madang will alter the present situation where more than 90 percent of the catch is exported in the frozen round.

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