

ORIGINAL : ENGLISH

SOUTH PACIFIC COMMISSIONTHIRTEENTH REGIONAL TECHNICAL MEETING ON FISHERIES

(Noumea, New Caledonia, 24-28 August 1981)

AN ASSESSMENT OF BAITFISH RESOURCES IN THE  
SOUTH PACIFIC COMMISSION AREA

(Paper Prepared by the Skipjack Programme)

1.0 INTRODUCTION

A primary objective of the Programme was to assess the baitfish resources of each of the 21 countries in the South Pacific Commission area. Results generated by the Programme have been combined with existing published information and results from recent commercial ventures to attain this objective.

The Programme relied heavily on the use of the bouki-ami net for baitfish survey work. This technique is highly efficient in sheltered lagoons, bays and estuaries; conditions which exist extensively throughout the area of the South Pacific Commission. Where the application of the bouki-ami was impracticable or night baiting conditions were adverse, the beach seine was utilised in shallow in-shore waters. For some island countries it was impossible to conduct either type of baitfishing operation because of the rugged nature of the coastline, deep water close to shore, and the absence of protection from ocean swell and waves. Such countries almost certainly do not have substantial resources of baitfish of the type which are vulnerable to presently known fishing methods.

2.0 RESULTS2.1 Bouki-ami and Beach Seine Catch Results

For each of the tropical countries where baitfishing operations were carried out, detailed records of locality, baiting technique and results were summarised to show baitfishing effort and catch. Throughout the area of the South Pacific Commission the bouki-ami net was used on 561 occasions and resulted in the capture of 68,629 kg of bait. The beach seine was used 74 times and resulted in 3,357 kg of bait. Averages for the bouki-ami net and the beach seine were 122 kg and 45 kg per haul respectively. Much higher average catches, in excess of 250 kg per haul, were recorded for the bouki-ami in the temperate waters of Australia and New Zealand which are outside the area of the Commission.

The results obtained from use of the two methods are summarised in Table 1. On occasion the amount of bait caught exceeded the carrying capacity of the survey vessel and bait was released alive. This portion, together with any bait discarded during loading because of poor conditions, led to the often sizeable differences between the amounts of bait caught and loaded.

### 3.0 BAIT CATCH COMPOSITIONS

The size, origin, and topography of the South Pacific islands is, in most instances, an excellent indicator of their baitfish resource potential. Islands with large water catchment areas and high freshwater flows, bringing sediments and nutrients into extensive lagoon or sheltered in-shore environments, provide ideal habitat for numerous bait species. Small island atolls, on the other hand, are limited in their range of suitable bait habitat. The great variation in topography of the countries is reflected in the diversity of the bait species captured. Most of the sizeable catches of good quality baitfish taken within the region were from one of four major species groups. The families represented are the Engraulidae (anchovies), Dussumieridae (sprats), Clupeidae (sardines, herrings) and the Atherinidae (hardyheads). Less regular (and in some instances less desirable) contributions were made by the families Carangidae (scads and jacks), Apogonidae (cardinal fishes), Caesioidae (fusiliers) and Siganidae (rabbitfish).

Most species of anchovies found in the South Pacific area are regarded as excellent bait and their availability in quantity in the baitfish resources of any country must be regarded as a major asset to the potential of the bait resources. Almost all of the anchovies taken were of the genus Stolephorus. The most common target Stolephorid species are Stolephorus heterolobus and Stolephorus devisi. Other highly desirable bait species belong to the sprat, sardine and hardyhead groups and include the genera Spratelloides, Sardinella, Herklotsichthyes and Hypoatherina. The relative proportion of these species groups in the survey hauls is expressed in Table 2 as the estimated percentage composition by weight of the catches. The countries and the subdivisions of the extensive areas of French Polynesia and the Federated States of Micronesia are listed in order of their land area to facilitate comparisons of species composition.

### 4.0 RESOURCE ASSESSMENT

The potential baitfish resources of each country have been evaluated on the basis of existing catch and effort data and results of the Programme's surveys. This potential has been gauged on the resource's ability to support bouki-ami units of the type used by commercial pole-and-line vessels. This assessment does not take into account potential for types of small scale bait fisheries such as that operating in Western Samoa. In some countries a commercial baitfishery is well established while in others, it is in the planning process. It can be seen that for many island countries only a limited baitfishery potential exists.

TABLE 1. EFFORT AND CATCH RESULTS FOR BAITFISHING TECHNIQUES COMMONLY USED BY THE PROGRAMME\*

	B O U K I - A M I					B E A C H   S E I N E				
	No. of Baiting Localities** Fished	No. of Hauls	Total Catch (kg)	Loaded Catch (kg)	Average Catch Per Haul (kg)	No. of Baiting Localities Fished	No. of Hauls	Total Catch (kg)	Loaded Catch (kg)	Average Catch Per Haul (kg)
Papua New Guinea	26	57	6,840	5,323	120	2	4	99	96	24
Solomon Islands	24	60	8,965	8,406	148	0	0	0	0	-
New Caledonia	14	40	5,207	4,778	130	0	0	0	0	-
Fiji	26	71	12,821	12,134	180	1	1	0	0	-
Vanuatu	3	5	177	177	35	0	0	0	0	-
Western Samoa	5	14	1,130	1,067	80	0	0	0	0	-
Society Islands	7	27	893	767	33	3	8	44	44	5
Marquesas Islands	6	44	5,601	5,367	127	4	34	1,062	952	31
Tuamotu Islands	3	27	1,196	1,051	44	0	0	0	0	-
Kiribati	5	21	1,198	1,155	57	3	7	1,782	907	254
Tonga	6	32	1,097	1,085	34	3	12	190	190	15
Palau	9	34	3,310	2,996	97	0	0	0	0	-
Ponape	3	36	5,056	4,534	140	0	0	0	0	-
Niue	0	0	0	0	-	0	0	0	0	-
Cook Islands	3	15	585	489	39	0	0	0	0	-
American Samoa	4	5	180	138	36	0	0	0	0	-
Marshall Islands	5	8	609	567	76	2	4	89	87	22
Yap Islands	1	2	258	255	129	0	0	0	0	-
Wallis and Futuna	4	36	10,501	9,134	291	0	0	0	0	-
Truk Island	4	8	690	672	86	1	1	50	50	50
Kosrae	2	10	807	598	80	0	0	0	0	-
Norfolk Island	0	0	0	-	-	0	0	0	0	-
Tuvalu	6	15	1,508	905	100	0	0	0	0	-
Nauru	0	0	0	-	-	0	0	0	0	-
Tokelau	0	0	0	-	-	1	3	41	41	13
Pitcairn Islands	0	0	0	-	-	0	0	0	0	-

\* Countries and subdivisions are tabled according to their land areas.

\*\* Localities comprise all baitfishing sites within an area of approximately one square mile.

TABLE 2. RELATIVE PROPORTIONS OF MAJOR BAIT GROUPS IN BOUKI-AMI CATCHES \*

	Anchovies	Sprats	Sardines	Hardyheads	Other
	Estimated % Composition by Weight	Estimated % Composition by Weight	Estimated % Composition by Weight	Estimated % Composition by Weight	Estimated % Composition by Weight
Papua New Guinea	71.4	7.7	13.7	0.9	6.7
Solomon Islands	43.0	11.1	22.2	0.8	22.8
New Caledonia	62.5	3.7	15.1	0.3	18.4
Fiji	22.0	20.0	42.4	4.7	10.9
Vanuatu	29.4	34.6	10.4	17.6	7.8
Western Samoa	69.5	1.3	1.3	0	27.9
Society Islands	5.7	16.5	5.0	0	72.8
Marquesas Islands	0	0	87.9	0	12.1
Tuamotu Islands	0	100.0	0	0	0
Kiribati	0	29.3	8.9	25.0	36.7
Tonga	23.8	16.3	15.5	19.2	25.3
Palau	56.2	31.1	1.3	7.6	3.7
Ponape	71.2	3.0	9.3	16.2	0.3
Niue	0	0	0	0	0
Cook Islands	0	96.3	0	3.4	0.3
American Samoa	89.4	10.6	0	0	0
Marshall Islands	0	7.4	67.5	25.0	0
Yap Islands	81.8	0	0	1.2	17.0
Wallis and Futuna	82.3	1.1	15.1	0.1	1.4
Truk Island	0	31.4	31.5	37.0	0
Kosrae	68.0	0	21.2	0	10.5
Norfolk Island	0	0	0	0	0
Tuvalu	0	90.3	0	4.6	5.1
Nauru	0	0	0	0	0
Tokelau	0	0	0	0	0
Pitcairn Islands	0	0	0	0	0

\* These proportions are based on weight estimates for each species.

#### Papua New Guinea

-----

The existing live bait fishery in Papua New Guinea relies heavily on both anchovies and sprats. The present fishery is probably exploiting the resources of the few areas in which it operates at close to maximum levels. There are several potentially good baitfishing areas additional to those already being exploited. However, the number and extent of these are less than would be expected from such a great length of coastline.

#### Solomon Islands

-----

The existing baitfishery supplies more than 20 locally based pole-and-line vessels with sufficient bait each year. The major species are stolephorid anchovies and the baiting areas are both numerous and extensive. The baitfish resources of the Solomon Islands are among the largest in the Western Pacific and at present appear to be underexploited.

#### New Caledonia

-----

The lengthy coastline, high freshwater runoff, extensive mangrove flats and wide lagoon areas provide habitats for numerous bait species including sardines and anchovies. The high survey catches confirm that waters of the island have an excellent potential for the development of a major baitfishery. Some problems with seasonality of the resource can be anticipated.

#### Fiji

-----

The baitfish resources of Fiji presently support the local pole-and-line fleet of 11 vessels. The large number of islands in the group contain over 100 baiting sites, only a few of which the fleet presently utilises. The species supporting the fishery consist mostly of sardines and sprats. With proper management, the resources should be adequate to support a reasonable increase in baitfishing effort.

#### Vanuatu

-----

Although the presence of stolephorid anchovies in the survey catches was encouraging, the size of the catches was disappointing. The number of areas suited to bouki-ami operations are few and hence the potential is considered limited.

#### Western Samoa

-----

The extensive coastline provides only a few anchorages sufficiently sheltered to be suitable for baitfishing. With one exception, the catches were disappointing. The total baitfishing resource is considered limited.

### Society Islands

-----

Survey results showed small quantities of desirable bait, predominantly sprats, in the six major island lagoons investigated. These results weigh against the potential for the establishment of a large scale baitfishery.

### Marquesas Islands

-----

The Marquesan bait resource consists predominantly of one species, the Marquesan sardine, Sardinella marquesensis. Even though adequate quantities of this bait were obtained using both beach seine and bouki-ami, the dependence of this fishery on one species and the progressive decline over the relatively short period of fishing pressure from the survey vessels warrants a cautious approach to planning for its intensive use.

### Tuamotu Archipelago

-----

Although there is access to many of the lagoons, the poor survey catches, comprising only sprats, suggest limited baitfishing potential.

### Kiribati

-----

During the surveys, reasonable beach seine catches were made while the results of the bouki-ami hauls were poorer than expected. The most abundant species are sardines and hardyheads. The differences in both bouki-ami and beach seine catches between the two survey visits suggests a marked fluctuation in baitfish populations. Even though extensive baitfishing areas exist, the baitfishing potential must be considered limited in view of the results obtained.

### Tonga

-----

Survey catches were low at the sites examined but were influenced by full moon conditions. The potential of the bait resource is enhanced by the large number of baiting sites and diversity of bait species. The resource must be viewed as suitable for a small scale fishery only.

### Palau

-----

The Rock Islands provide most of the catch presently used by the commercial fleet of 13 vessels. Many other suitable localities exist in the islands for baitfishing. Quite large areas are enclosed by reef and offer potential baiting localities. The major species are stolephorid anchovies. Helen Reef to the south also offers some potential based on bait species such as Spratelloides delicatulus.

#### Ponape

-----  
Although the island is not large, the extensive lagoon associated with this high island provides an excellent environment for stolephorid anchovies. The results obtained by the survey vessels indicate a good potential for a baitfishery based on anchovies.

#### Niue

-----  
The lack of shallow and protected baitfishing areas precludes the development of a baitfishery near the main island. No suitable baitfish were observed in the lagoon at Beveridge Reef.

#### Cook Islands

-----  
Fishing locations surveyed by the Programme vessels revealed small quantities of bait, predominantly sprats (Spratelloides delicatulus). In view of the fluctuations in the survey catches and the few potential baitfishing areas, the baitfishing resource is considered limited.

#### American Samoa

-----  
The establishment of a major baitfishery in American Samoa is limited by the few small areas suited to bouki-ami operation. The presence of stolephorid anchovies is encouraging. However, the small survey catches and the constraints of a small baitfishing area suggest that American Samoa does not have a substantial baitfish resource.

#### Marshall Islands

-----  
These atolls provide habitat for quantities of sardines and hardyheads. The baiting potential must be viewed as good for beach seine operations and for the use of the bouki-ami where lagoon entry and suitable water depths are available. As with most atoll situations, fluctuations in the availability of the resource can be expected.

#### Yap Islands

-----  
Although stolephorid anchovies were recorded from Yap Island, the number of baiting areas is quite small and is unlikely to support annual catches of much more than a few tonnes of baitfish. Atolls of the group, primarily Ulithi, are likely to support quantities of sprats and sardines.

#### Wallis and Futuna

-----  
The large catches of stolephorid anchovies during the surveys indicate that the Wallis lagoon has good potential for a baitfishery. Even though the lagoon is extensive, much of it is inaccessible to pole-and-line vessels for bouki-ami operations. The limited number of baiting areas will restrict the scope of any baitfishery.

#### Truk Island

-----  
The size of the lagoon in Truk implies a large baitfish resource. However, the results of the Skipjack Programme survey revealed only small quantities of sprats (Spratelloides spp.) and hardyheads, and very few anchovies. Although previous catch figures suggest a reasonable resource, survey results and the potential for fluctuating catches suggest a limited baitfishery.

#### Kosrae

-----  
The island itself is very small and the limited number of baitfishing areas almost precludes any extensive development of the baitfish resource. One feature of the resource is the presence of stolephorid anchovies.

#### Norfolk Island

-----  
In the absence of suitable sheltered baitfishing areas there is little, if any, potential for the development of a baitfishery in Norfolk Island waters.

#### Tuvalu

-----  
A number of bouki-ami hauls in Funafuti lagoon produced some good catches of only one species (Spratelloides delicatulus). This species normally exhibits wide seasonal fluctuations in abundance and, in addition, is thought to be very vulnerable to heavy fishing pressure. The limited number of baitfishing localities with protection and suitable depth also restrict the potential development of a year-round baitfishery.

#### Nauru

-----  
Nauru lacks suitable habitat and baitfishing areas, hence, there is little, if any, potential for the establishment of a baitfishery in its waters.

#### Tokelau

-----  
The lack of suitable entrances to the lagoons of the atolls restricts access for a bouki-ami based baitfishery. However, a small beach seine fishery for small vessels may have some potential.

#### Pitcairn Islands

-----  
The steep and rugged coastline and the absence of sheltered areas precludes the development of a baitfishery in the Pitcairn Islands.