

BAIT FISH IN NEW - CALEDONIA

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In 1980 the "Office de la Recherche Scientifique et Technique Outre-Mer" (ORSTOM) undertook the study of live bait resources in the lagoon of New Caledonia. Six prospection campaigns have already taken place and the first results of this work are given below.

I - RESEARCH PROGRAM AND FISHING METHOD EMPLOYED.

Every two months the research vessel "Vauban" conducts a two-week prospection campaign around New Caledonia at the time of the new moon. Each campaign entails a visit to 14 sites with two fishing operations per night, one at 11 p.m. and the other just before daybreak. Lagoons located south and north of New Caledonia, the Loyalty Islands and the Chesterfield Group have to date remained unexplored. Since the "Vauban" has no water circulating live-bait tank on board, no experience has been acquired concerning survival of bait in the tank and its power of attraction for tuna.

Vertical fishing nets with small mesh (5mm per side) similar to the "bouki-ami" used by Japanese pole and line vessels in the Western tropical Pacific serve for this purpose. Depending on the depth of the fishing location two nets are used, one 11 m wide with a drop of 13 m, and the other 13 m by 20 m. This fishing tackle is chosen for its simple design and straight forward handling. A purse-seine net was tested in March 1981 with extremely satisfactory results.

All fishing expeditions take place at night with one or the other bouki-ami depending on the depth involved. The R/V Vauban is anchored before nightfall in selected fishing area usually in a bay sheltered from dominant winds with a minimum depth of 13 meters. At dusk two 1000 W lamparos are submerged at a depth of 5 meters one to starboard, and the other at the stern portside. Another 400 W light is placed above water at the stern. Attracted by the light, the fish gradually veers towards the vessel.

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Much is known about handling the lamparo and bouki - ami (KEARNEY, 1977). In several places, fishing had to be brought forward or delayed, sometimes even cancelled because of the current or wind chop. The entire catch is hauled aboard and weighted. A sample is taken and the following points examined : distribution of species, composition in length, individual weight, sex and sexual stage, adiposity. Other scientific observations, temperature, salinity and the chlorophyll content of sea-water are conducted as well as sampling of plankton. An echosounder is used to follow the development of fish concentration below the vessel.

II - RESULTS

Six campaigns have already been conducted. They took place in March, May, July, September and November of 1980 and in February 1981. 34 sites were visited (19 several times over) (Fig. 1). Fishing operations were in excess of 150 sets.

Almost 11 tons of fish were captured during these six campaigns. The average catch per set was 72 kg and the mean night catch 130 kg. Fish catches were staggered from zero, a few individual, to more than 650 kg. In view of the reduced sizes of our nets, these results are satisfactory.

The catch per set and the night catch vary considerably depending on campaigns (Table I, fig. 2, 3 and 4) presenting a maximum in February - March and a minimum in November. Catches are observed to drop sharply in September. Yields follow the same pattern inside each geographic zone. They are most stable in the west ; catches in the east are mediocre and the mean catch per set has never exceeded 71 kg.

Approximately twenty species (see attached list in annex) are regularly found in catches, of which about twelve can be used as live bait for tuna fishing. Gold-spot herring (*Herklotsichthys punctatus*) is the widest fished species, representing 36 % of total catches (Table II). These are followed in order of decreasing importance by, sardine (*Sardinella sirm*), hardy-heads (*Pranesus pinguis*), anchovies (especially *Stolephorus heterolobus* and *S. indicus*), sprats (*Spratelloides spp.* and *Dussumeria acuta*) and several species of Leiognathidae. 6 % of the catch are composed of species unsuitable as bait, either because of their behavior during tuna fishing, or because they are too large in size. The distribution of these species depending on campaigns is extremely varied (Fig. 5). Anchovies are the more plentiful in the warm season from November to May, sharp-nose sprat (*Dussumeria acuta*) in the cold season from July to November. In November 1980 and February 1981,

sardines outnumbered the gold-spot herring to become the principle species.

Hardy-heads, gold-spot herring, sardines are abundant in all zones but predominate on the east coast and in the south where they make up the bulk of catches. On the west coast and in the north, several species of anchovies are frequently found and appear abundant in both these zones. Similarly the sharp-nose sprat is frequently found. Certain quantities of species are also found whose bait value is minor such as the Leiognatids and *Scomberomorus tol*.

It is considered that in New Caledonia, fish with a total length of between 5 and 12 cm are perfectly suitable for skipjack fishing. Gold-spot herring, hardy-heads, all anchovies, blue sprat and silver sprat are excellent bait. On the other hand sardines, sharp-nose sprat and scads have an average size of between 14 and 16 cm and are better suited for fishing skipjack of 10 kg (rare in the region) and yellow-fin tunas. The average size of the bait also varies depending on campaign. Thus during the 80 A6 campaign (February 1981) the fish of the principal species were far smaller than usual. Reproduction had just taken place and there were several young fish amongst the catches. The average size of gold-spot herring, sardines, hardy-heads and sharp-nose sprats increases from March to July and then becomes stable.

Since R/V Vauban has no sea-water circulating live bait tanks on board it was impossible to test bait survival. However, some observations were conducted on board a pole and line vessel the MANUS STAR, which operated in New Caledonia waters in August and September 1980 (BOELY, 1980). On the whole the bait was far more resistant in New Caledonia than in Papua New Guinea and the Solomons Islands. Gold-spot herring, sardines and hardy-heads were kept in a live bait tank for almost one week; sharp-nose sprat reputed for his extreme fragility was kept alive for several days. This phenomenon could be explained by the relative coolness of the seawater surface (22° - 25° C) at this time of the year.

CONCLUSION

The study of resources of live bait follows the pattern of a prospecting campaign every two months and will encompass the whole of the lagoon of New Caledonia and the Loyalty Islands starting in the second half of 1981.

Approximately thirty fishing areas were visited and more than 150 night fishing operations conducted with the use of a bouki - ami. The average catch per

set was 72 kg with a mean night catch of 130 kg. Optimum yields were obtained from January to July. The most productive areas were the west coast and the north of New Caledonia. Least successful results were obtained on the east coast. Since one of the aims of this program was to explore as many fishing sites as possible, results obtained are certainly lower than catches possibly obtained by a commercial pole and line fishing vessel which would seek out and make use of the best places for baiting. Such was the case in September 1980 with the MANUS STAR.

Approximately twelve species supply good quality bait. Among these gold spot herring and sardines are plentiful in all sectors. Anchovies and sprats are particularly found on the west coast and in the north. The size of these fish are perfectly suited for skipjack fishing except for sardines which are slightly larger.

On sight of the first results pole and line vessel can be based in New Caledonia and be supplied with live bait in sufficient quantity in the lagoon of New Caledonia despite a major seasonal variability. The most successful bait yields coincide with the maximum presence of skipjack. This bait could also be used by

LIST OF PRINCIPLE SPECIES CAPTURED

Engraulidae : Anchovies

Stolephorus indicus
Stolephorus bataviensis
Stolephorus heterolobus
Stolephorus doisi
Stolephorus buccaneeri
Stolephorus commersoni
Thryssina baelana

Clupeidae : Herrings and sardines

Herklotsichthys punctatus : Herring
Sardinella sirm : Sardinella
Sardinella leiognaster : Sardinella

Dussumeriidae : Sprats

Dussumeria acuta
Spratelloides delicatulus
Spratelloides gracilis

Atherinidae : Hardy - heads

Pranesus pinguis
Hypoatherina spp.

Leiognathidae

Gazza minuta
Leiognathus bindus
Leiognathus equulus

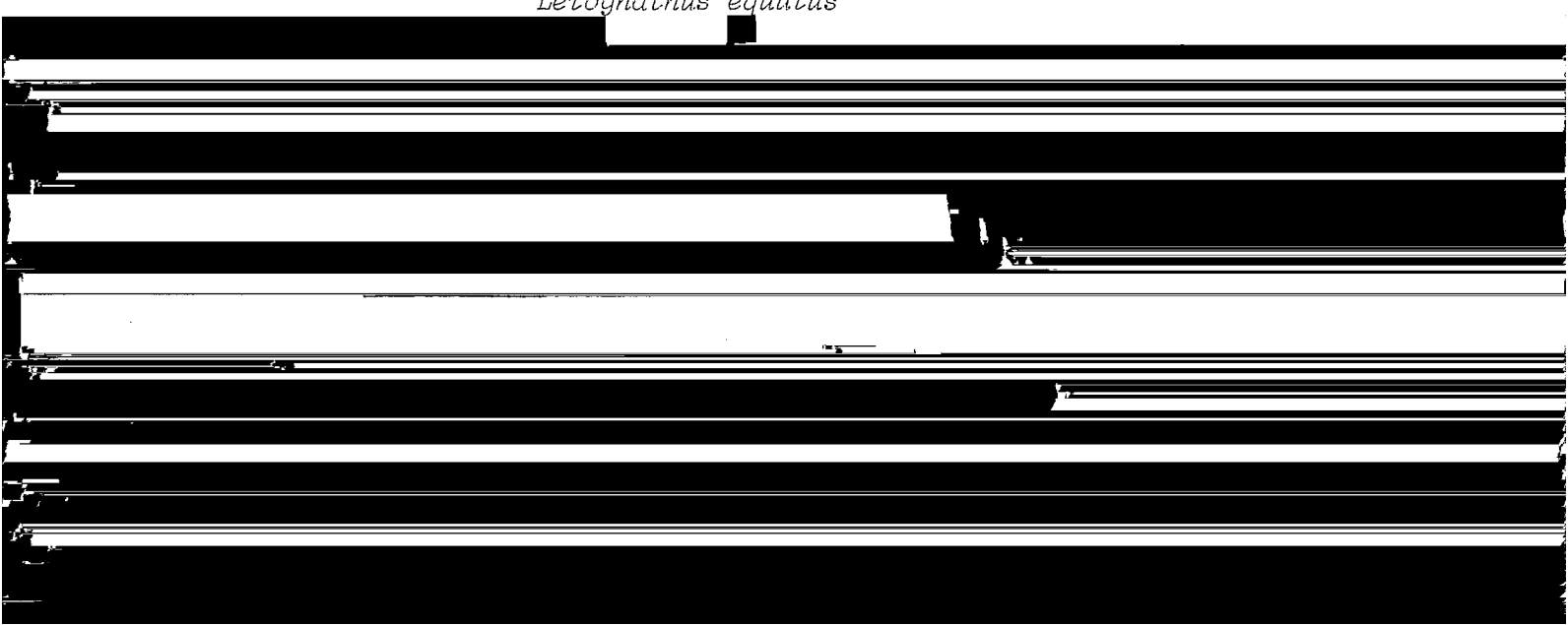


Table I - Yields obtained in the four geographical zones of New-Caledonia.

Zone	Catch per set (kg)						Catch per night (kg)					
	march 1980	may 1980	july 1980	sept. 1980	nov. 1980	feb. 1981	march 1980	may 1980	july 1980	sept. 1980	nov. 1980	feb. 1981
West	127	105	111	52	45	95	170	210	199	103	91	190
North	197	153	171	47	7	128	296	203	284	78	13	193
East	39	31	14	15	3	70	71	63	25	29	4	139
South	130	156	23	35	15	147	261	311	45	70	23	295
Total	112	88	81	36	19	102	183	163	144	69	34	191

Table II - Percentage of principal species or group of species in the catches of each campaign.

Species	80 A1 march	80 A2 may	80 A3 july	80 A4 sept.	80 A5 nov.	80 A6 feb.	TOTAL
Anchovies : <i>Stolephorus</i> spp. <i>T. baelama</i>	15,5	13,5	1,1	3,6	10,4	19,9	12,3
Herring, <i>H. punctatus</i>	37,7	38,3	56,4	26,1	4,4	25,5	35,9
Sardine, <i>S. sirm</i>	28,8	11,0	20,1	6,1	61,0	33,6	24,0
Sprats, <i>D. acuta</i>	1,6	4,3	7,0	21,6	} 9,3	4,4	6,3
Sprats, <i>Spratelloides</i> spp.	1,5	-	0,1	0,1			
Hardy-head : <i>P. pinguis</i> <i>Hypoatherina</i> sp.	11,2	20,4	8,0	23,7	4,9	4,4	11,7
Leiognathidae	0,6	8,1	0,8	9,5	4,2	2,6	3,6
Others	2,9	4,2	6,4	9,3	5,8	9,6	6,2

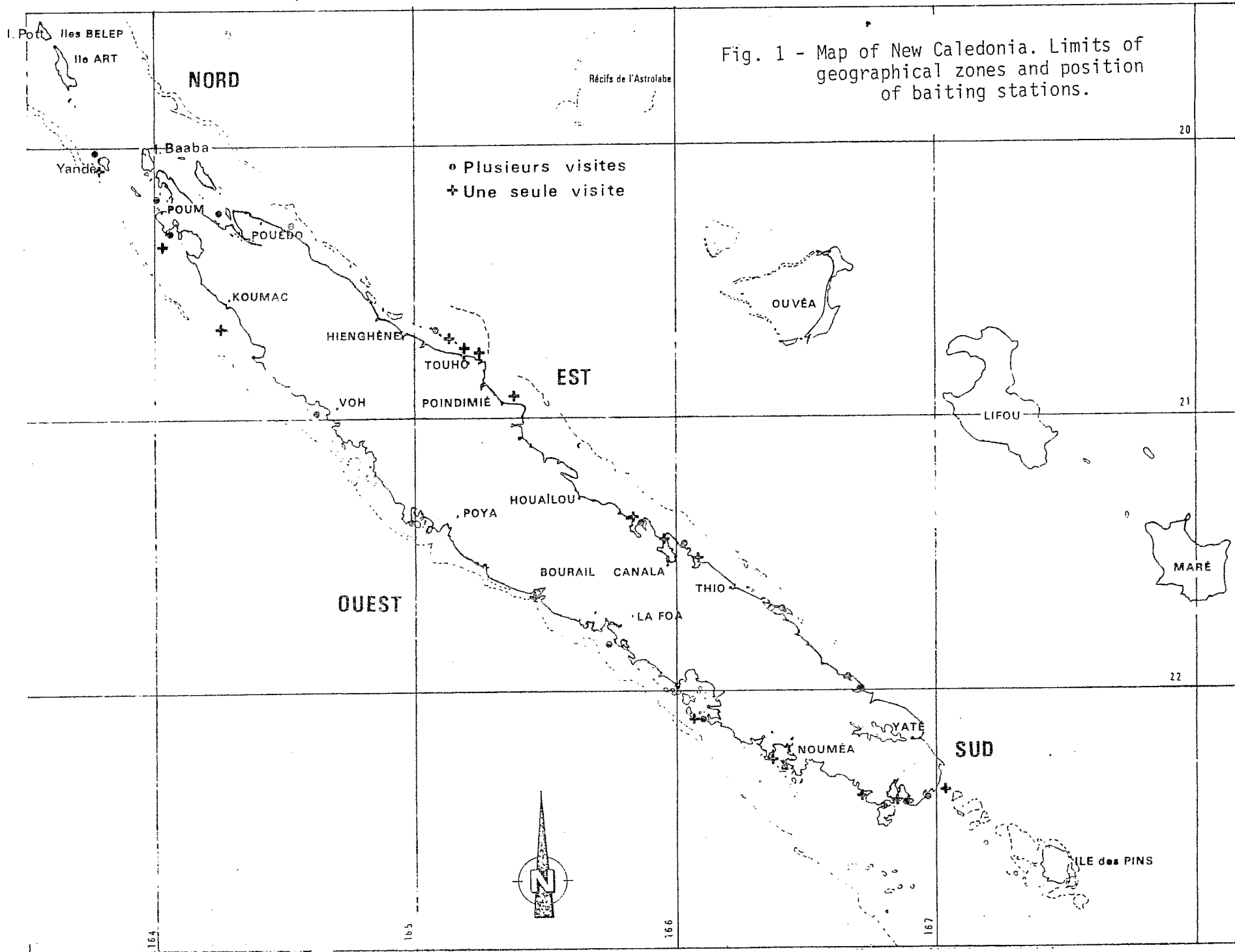


Fig. 1 - Map of New Caledonia. Limits of geographical zones and position of baiting stations.

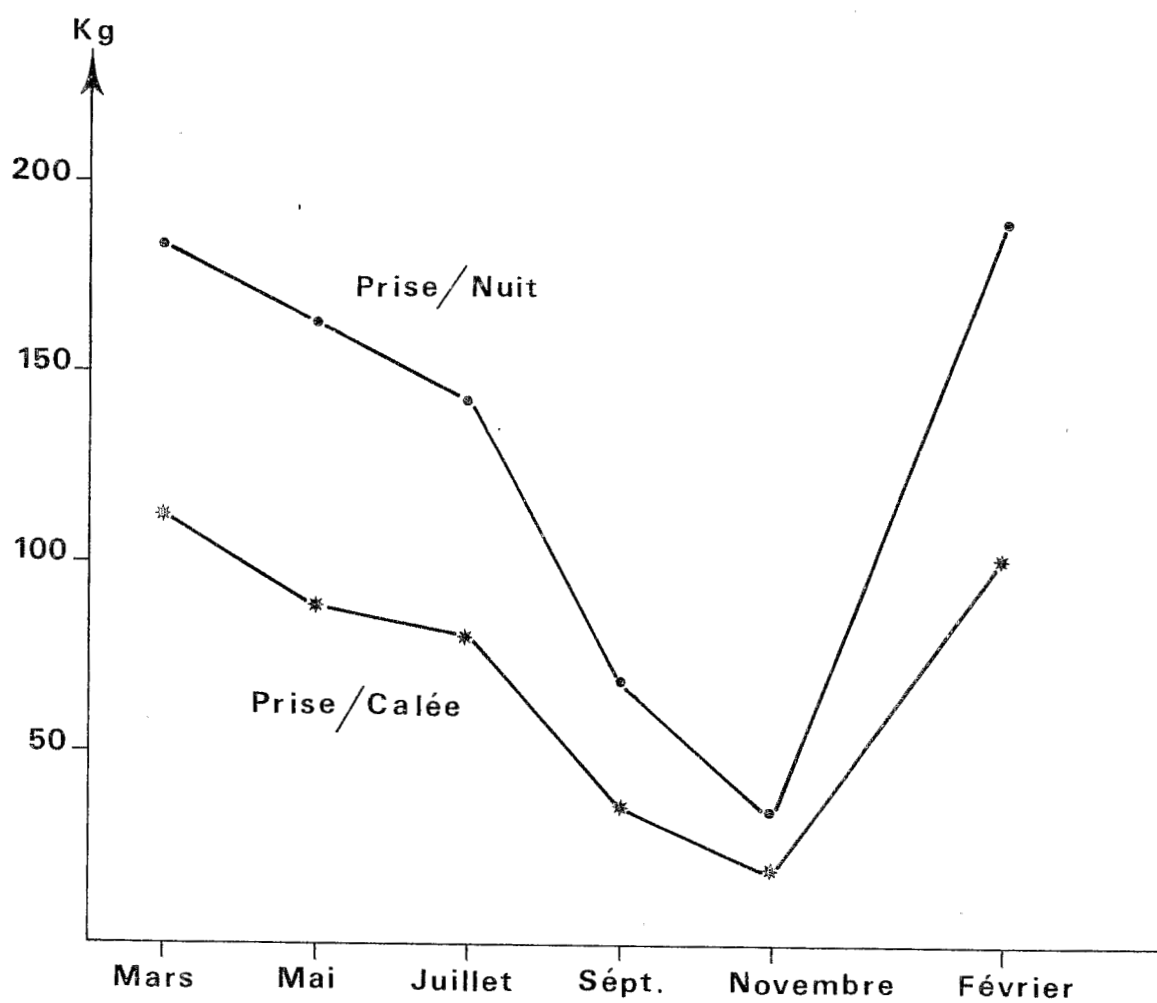


Fig. 2 - Seasonal variation of the catch per set and catch per night.

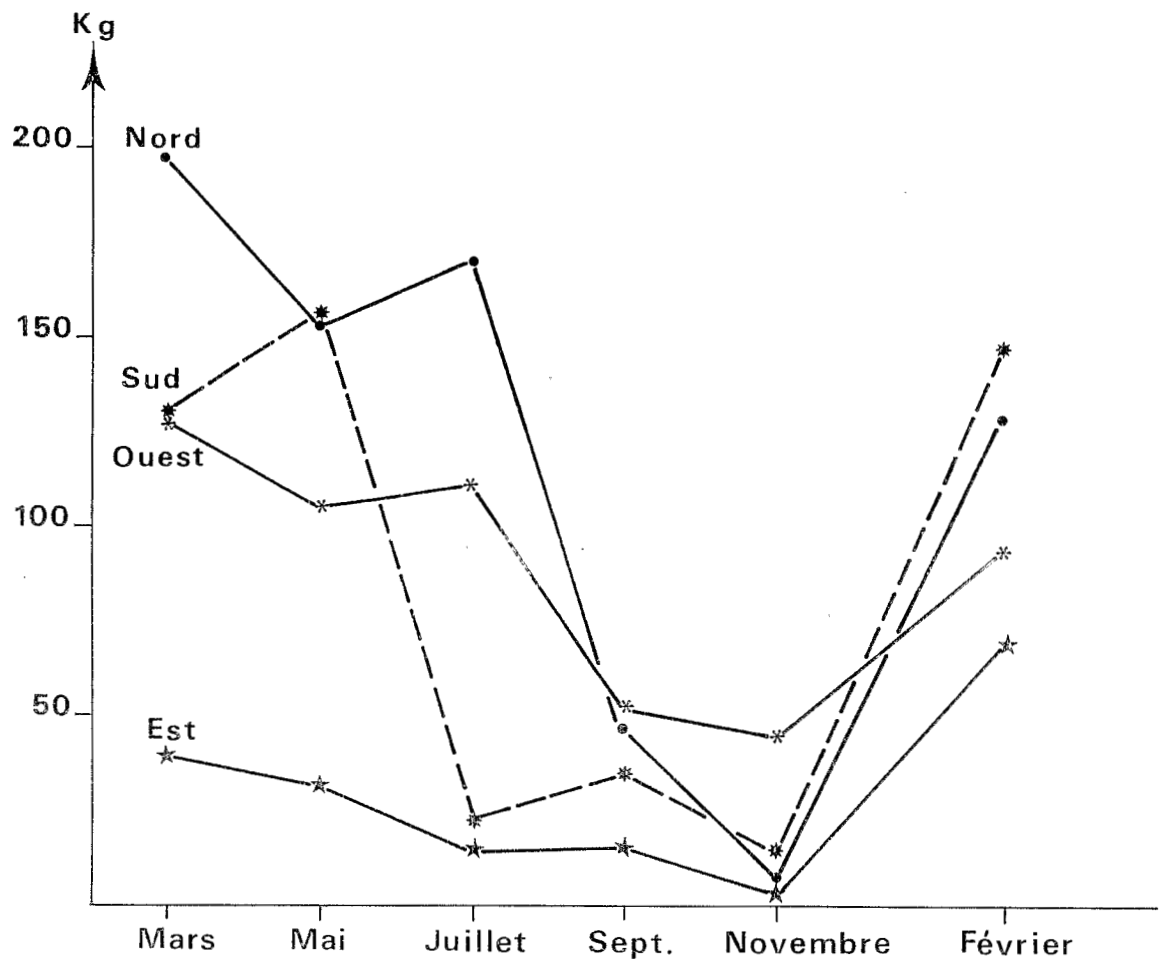


Fig. 3 - Seasonal variation of the catch per set in the different geographical zone.

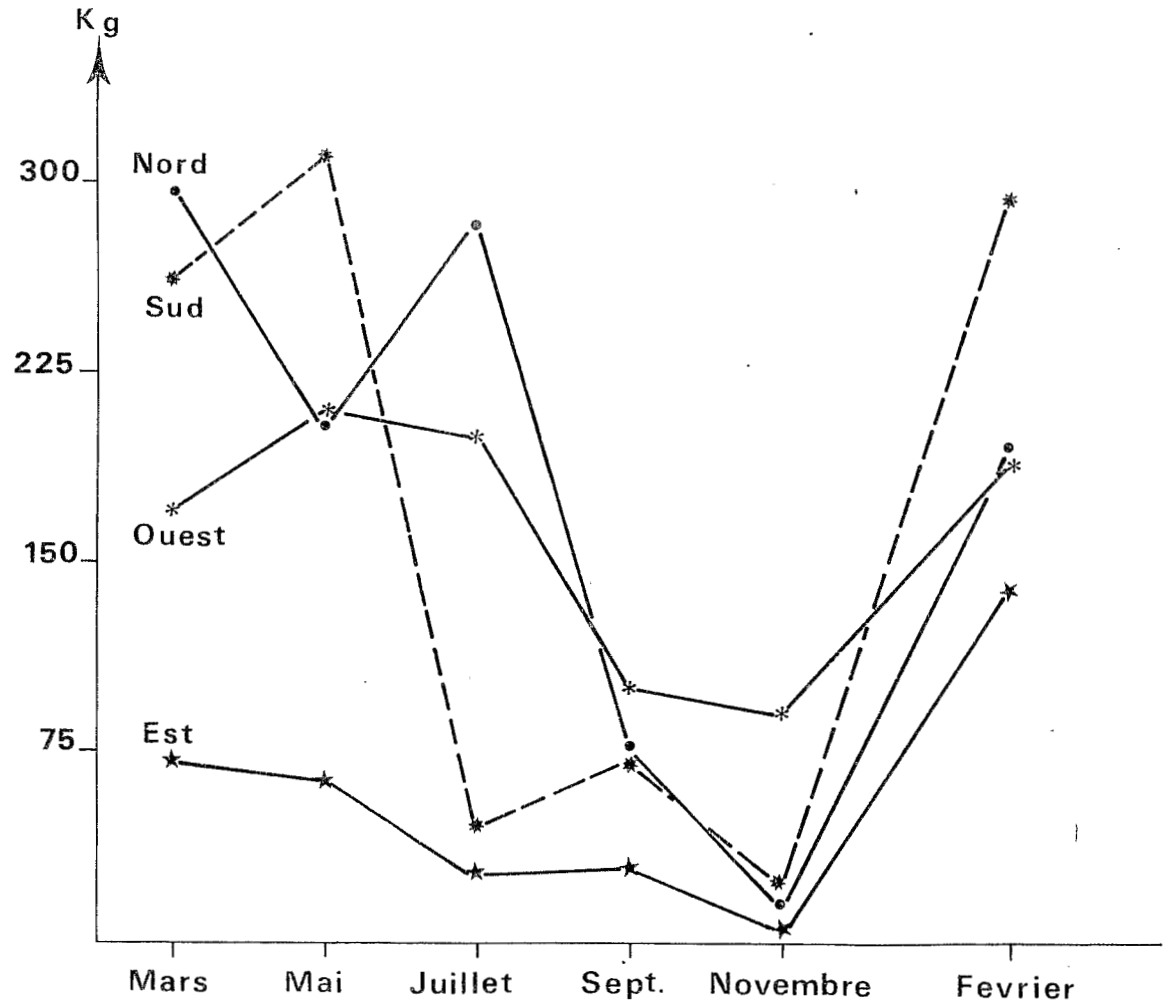


Fig. 4 - Seasonal variation of the catch per night in the different geographical zone.

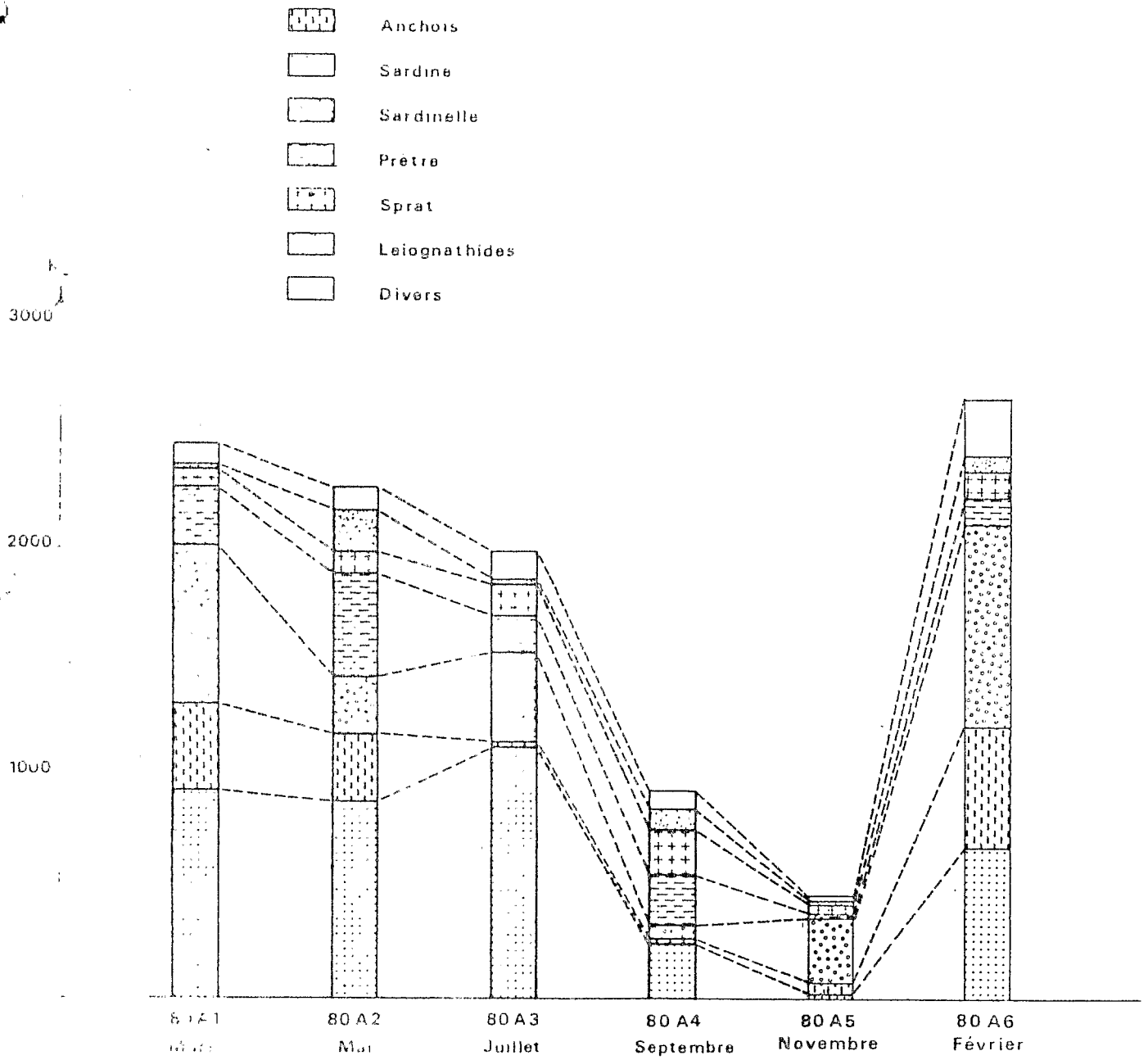


Fig. 5 - Catch per species or per group of species for each campaign.