

Problems of Live Bait Associated with Skipjack Tuna Fishing

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The importance of Skipjack tuna fishing to the economy of the Pacific Island territories has already been well established. This fishery is based at present, almost entirely, on the live-bait-pole-and-line method of fishing. The availability of live bait, therefore, from natural populations of suitable species, or from suitably cultivated species, is essential if the industry is to develop. It is conservatively estimated that some 250,000 metric tons of tuna from a total of 1,150,000 tons (which is the estimated world landing of tuna) is caught by the live-bait-pole-and-line method.

The principal species taken by this method are the surface schooling *Katsuwonis pelamis* (Skipjack) the yellow fin tuna (*Thunnus albacares*) and other surface-schooling species such as *Euthynnus spp.* and *Auxis spp.*

The Method

The live-bait-pole-and-line method is not a sophisticated technique in actual operation. A considerable amount of expertise, however, is necessary in catching and keeping live bait until it is actually 'chummed' to the surface-schooling tunas. The technique of holding tunas until they have reached the feeding frenzy stage requires expertise and experience, and it is in this stage that a good 'bait man' becomes the key figure in the operation. The poling, hooking, and landing of the tuna also requires its own special skill. The tuna when hooked is pulled gently (the hook is barbless and dislodges easily) towards and past the fisherman to be dishooked by a flick of the rod on to the deck.

This method contrasts with the labour intensive and long tedious slog of pelagic long-lines for the larger tunas. The fisherman is more actively involved physically, and the excitement; when the tuna are in their feeding frenzy, is a real stimulant to effort. South Pacific Islanders take to this fishery with considerable zest, and manning of Skipjack fishing boats is not considered a constraint to the development of this fishery.

The Bait.

The most successful live bait must have good holding characteristics: it must be able to survive repeated handling, it must be attractive to the schooling tunas while remaining as near the surface during the 'chumming' period. Bait fishes which dive on being 'chummed' do not prove successful. Fishes of the anchovy and sardinella families do particularly well, as they are colourful, quick moving, and, usually, good keepers. Tropical reef species can also be used to good effect. These include juvenile mullet (*Mugilidae*), cardinal fishes; (*Apogonidae*) Silverside (*Atherin-*

dae) and occasionally even Rabbit fish (*Siganidae*) though this species requires careful handling, having poisonous dorsal fins.

The technique of cultivating a suitable live bait species is also being seriously looked at to support natural populations. This is of particular importance in areas, where, for hydrographical or other reasons the occurrence of natural populations is unlikely, or is available in conditions which make their catching alive difficult. This is the case in the Gilbert Islands, where a large programme for cultivating milkfish (*Chanos Chanos*) in pond conditions specifically for the live-bait-pole-and-line fishery is now in progress. Parallel developments, based on the cultivation of fishes of the family *Poeciliidae* are being undertaken in Hawaii, in Western Samoa, and in the Kingdom of Tonga.

The family *Poeciliidae* are well known commonly as Guppies, or Top Minnows to the aquarium trade. They are viviparous, giving birth to 100-150 well-developed young every 25-30 days. They are easily adaptable to varying degrees of salinity and temperate changes and are a hardy, good-keeping species. Their behaviour under chumming conditions has yet to be fully assessed; their inclination to dive when chummed and their relative slowness in movement make them less attractive to the schooling tunas.

Mixed with more suitable wild species, Mollies do have possibilities, and provide useful supplementation when natural occurring bait is absent. Juvenile mullets and Milkfish have also proved successful. These are, of course, recognised food fishes for Pacific Islanders; but the taking of juveniles, *en masse*, could affect the future of the breeding stocks. Their use, therefore, should be used with a degree of discretion, if not entirely restricted.

Cichlid fishes such as *Tilapia mossambica* have also been tested with varying degrees of success. This species is a frequent spawner with a high productive capacity, and has already been used on live bait trials. It also has the unfortunate tendency to sound. Trials carried out mainly in Honolulu have shown that schooling tunas such as Skipjack and larger Yellow fin, can be caught using live *Tilapia* bait, in conjunction with other species such as *Stolephorus sp.* The optimum size for *Tilapia*s would appear to sound more quickly than the smaller size. *Tilapia mossambica* have been introduced to many Pacific territories. They have inundated the brackish water systems and are not highly regarded as food fishes. They can be cropped for live bait operations without serious regard to the diminution of the species. In many areas, this would be welcomed.

The cultivation of a suitable bait species in aquaculture conditions must be looked at from an economic, as well as a biological aspect. The cost of feeding the bait fish can be expensive, as large amounts of live bait must be reared continually to support any worthwhile fishing effort. The keeping of live bait in impounded conditions can also be expensive unless suitable food is available locally.

Live Bait Holding Technique.

The longer bait can be kept alive on board the catching vessel the more economical the fishing operation. It is obvious that if a catcher has to return from fishing to replenish bait supplies, the operating costs will certainly escalate. Biologically, the keeping of live bait is dependant on the supply of dissolved oxygen, on the circulation and exchange of water in the tanks, and, of course, on the amount of nourishment in the water itself.

The forced circulation system which is now more generally used in commercial Skipjack vessels has a distinct advantage over the natural circulations systems of the past where sea water was circulated through bottom openings in the tanks and circulation dependant on the vessel's motion. This has disadvantages and heavy mortalities of live bait can occur when the vessel is in calm conditions.

Design of bait tanks is also important as a badly-designed tank will unsettle the fish, thus using up oxygen at an excessive rate. This is basically an engineering problem to which the Japanese have given their usual thorough attention. Japanese are now able to keep bait alive for weeks at a time on board their far-searching Skipjack boats; this contributes greatly to their success.

The Skipjack Fishery in the Pacific.

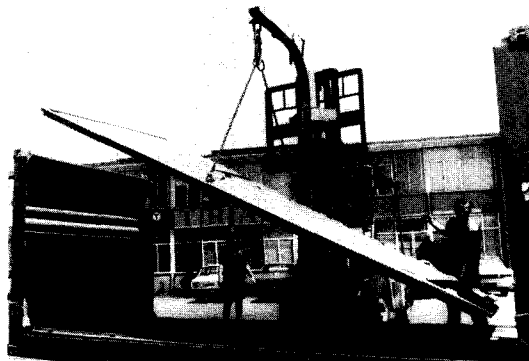
The Skipjack tuna is now recognised as being one of the least exploited pelagic resources; it has become a major revenue earner for the Solomon Islands, Fiji, New Hebrides, and the Trust Territories. The Kingdom of Tonga is investigating the possibilities with FAO/UNDP assistance; Western Samoa has also seen the possibilities and is looking afresh at this.

The Development of a Skipjack fishery (based on the live-bait-pole-and-line method) must be paralleled with the development of a live-bait-catching fishery. In fact, one is talking of two separate fisheries closely related to each other.

The prospects of a sound economy based on the Pacific Islands marine resources — in which the Skipjack tuna must be given priority — are good. Hopefully, Pacific Island governments will continue to see the development of their marine resources, not only as a source of revenue and food, but as a means of employment for Pacific Islanders in their own environment, thus sustaining their traditional culture.

product/service INFORMATION

NEW CONTAINERISATION TECHNIQUES INTEREST PACIFIC TRADERS



New techniques in containerisation designed to reduce stevedoring charges and increase productivity on the waterfront have been demonstrated to Australian shipping operators. The techniques have a particular interest for the Pacific area.

Sydney shipping executives saw a new collapsible container assembled and dismantled by two riggers and a forklift truck and locked into a 20 foot x 8 foot x 2 foot module in less than 20 minutes. They also watched a new 4-wheeled machine, the Arbilift, lift a full container from ground level and load it aboard a semi-trailer inside 10 minutes. Only two men, one driving a forklift truck, operated the machine. The demonstrations were held at the Mascot depot of Tradex Transport Pty. Ltd.

In dismantling the container, six catches are unfastened and the forklift slings are attached to the roof lift rings. The roof is then lifted and put clear of the operation. The side walls are lowered after slings are attached and the roof is then stowed between the end frames. The ends are finally lowered and the collapsed unit is ready for stacking.

Mr John Strang, Managing Director, Tradex, said there was urgent need to increase productivity and minimise high labour costs in shipping. The collapsible container, he said was particularly suited to the South Pacific trade where services, by and large, involved one-way movement of cargo.

"The 2-way carriage of an erected box is very expensive," he said. "The collapsing of containers and their handling in a module of four units obviously provides great incentive to move further forward into containerising trades which previously have been handled by conventional break bulk methods."