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BAIT FISHES OBTAINED FROM NIGHT LIGHT AND LIFT NET EXPERIMENTS IN PHANG-NGA BAY, ANDAMAN SEA, THAILAND

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ABSTRACT

Experiments with night lights and lift nets were conducted in Phang-nga Bay, Andaman Sea, Thailand to collect bait information for the development of pole-and-line tuna fishing of the country. The fishes caught comprised 44 species of 18 families. Most of them were young or very young fishes. The most abundant and consistently caught species were : *Allanetta forskali*, *Stolephorus devisi*, *S. heterolobus*, *Stenatherina temmincki* and *Stolephorus waitei*.

INTRODUCTION

Very little skipjack *(Katsuwonus pelamis)* fishing is done outside the Pacific Ocean. Consequently, research on this fishery has been virtually limited to that region. Nevertheless, there is every indication that the tuna resources (especially, *Thunnus albacares* or yellowfin tuna, *T. tonggol* or longtail tuna, *Katsuwonus pelamis* or skipjack tuna, *Euthynnus affinis* or eastern little tuna and *Auxis thazard* or frigate mackerel, etc.) in the Indian Ocean are under-utilized. Despite the wide distribution of skipjack tuna in all the warm seas of the world, wherever the water temperature is above 20°C, their major fishing grounds are found only in limited areas. Various reasons can be given for this but one of the important concerns is the problem of live bait supply. Compared with other areas it can be said that skipjack and other tuna in Thailand's coastal waters are on the fringes of their major known distributions. Nevertheless, these resources are locally known to be occasionally fished at a moderate level in certain seasons and areas off the Andaman coast. At present, they appear to be one of the suitable replacements for the already heavily fished demersal resources.

The recent interest of the Marine Fisheries Division of the Department of Fisheries of Thailand in the introduction of pole-and-line tuna fishing to this country (RITRAGSA & JIRASATIT, 1980) created an urgent need to study the tuna harvesting poten-

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tial of Thai waters. Such study must involve taxonomy, biology, handling and stock assessment of the bait fishes to prevent their depletion or the ruin of the ecosystem. Of immediate concern is determination of the species composition of the live bait fishes.

The favourite live baits used in Pacific skipjack chumming are anchovies of the species *Engraulis japonicus* and *Stolephorus purpureus*. Silversides or atherinids and clupeids, although regarded by pole-and-line fishermen to be inferior to the anchovies, are said also to be suitable as baits. Being stronger fishes, they can tolerate confinement without serious loss. There is evidence also that most of the good live baits have bright silvery colours. These fishes possess the characters.

Upon the suggestion of Dr. Walter Fischer to Mr. Robert E.K.D. Lee, project leader of "UNDP/FAO Pole-and-Line Tuna Fishing in Southern Thailand" in September 1979, I assisted in identifying a great variety of potential bait fishes, and had the opportunity of studying live-bait fishing aspects for tuna fishing in the Andaman Sea during 7 to 15 July, 1980.

METHODS

Night lights (six 500-watt bulbs at above water and a 500-watt underwater bulb) were operated overnight at depths ranging between 20 to 35 m every night at Ko Hong and nearby Ko Ka (limestone islands with very steep topography) in Phang-nga Bay on board the "R.V. Pramong 3" (59.6 tonnes, 21.3 m) of the Phuket Marine Fisheries Station, Department of Fisheries, Thailand. A lift net (18 x 15 m, mesh size 1 cm) was employed to catch live bait at about 0330 h when the tide was lowest and without any current; otherwise, there would be no catch. Unfortunately, three lift net operations out of eight night light sets were cancelled due to currents created by moonsoon winds and rain in the early mornings. In addition to the successful sighting hauls by the "R.V. Pramong 3," one perfect baiting using the same method was done on board the "R.V. Pramong 10" (93.3 tonnes, 25.6 m) of the same fisheries station, at Ko Ka. The latter vessel was normally engaged in observation of skipjack schools and in doing experiments on catching with pole-and-line, with the supply of live bait mostly from "R.V. Pramong 3". For self reliance she was also equipped with night lights and lift-net instruments, and also a 10 m^3 tank at stern for keeping the live-bait fishes.

RESULTS AND DISCUSSION

Observations from on board revealed that while the silversides formed uneven and spread-out schools at the surface of water, the anchovies *(Stolephorus* spp.) always concentrated in a more dense school (so-called "ball", although it is irregular in shape)

Figure 1. Location of Ko Ka (arrow) and general geography of Phang-nga Bay where night light and lift net experiments were conducted.

farther below the surface. The "ball" was whitish in colour and its movement was slow and very uniform. At the same time, larger fishes of several unknown species (possibly, *Megalaspis cordyla* and other carangid species) appeared underneath. Solitary or paired big needle fishes *(Ablennes hians, Tylosurus crocodilus* and *Hemirhamphus far)*, flying fish *(Parexocoetus brachypterus)*, cephalopods *(Lolilus rhomboidalis, Sepioteuthis lessoniana* and *Octopus dollfusi)*, mantis shrimps and jelly fishes (unable to catch for identification) also appeared frequently at or near the surface at the stations. Small schools (about 10-50 individuals) of very young mullet, *Valamugil seheli*, were found swimming amongst the silversides. The silversides sometimes jumped above the surface as they normally do when they are charged or disturbed by other animals.

During my observations, the most abundant night light fishes of Ko Hong and Ko Ka were *Allanetta forskali, Stolephorus devisi* (authors' "species A"), *S. heterolobus, Stenatherina temmincki* and *Stolephorus waitei* (authors' *S. bataviensis)*, respectively. Other species from the same samples from the catches were much less abundant and some species were represented by only one individual. Most of them were young or very young fishes of familiar families. I was informed by Mr. Jet Pimolchinda, who is responsible for various studies of the bait fishes in the project, that apart from the above species there were large catches of *Spratelloides delicatulus, S. gracilis* and *Sardinella gibbosa* in some other areas and seasons off Phuket island, Phang-nga, Krabi and Satun.

Judging from sightings and catches, bait availability appears to be good in this area. The night light behaviour and schooling habit of fishes in the near-shore waters, however, might one day be a possible cause of overfishing by Thai fishermen. Local fishermen are in the habit of catching all the small individuals and species possible for fish meal, fish sauces and fish paste. Because of the cost of fuel for electric power, Thai fishermen often use lamps with coconut-oil, which is plentiful and cheap in southern Thailand. It would therefore be better to base and promote night light fishing on sound scientific grounds rather than permit faulty and wasteful development of these resources.

Being close relatives, *Stolephorus devisi* and *S. heterolobus* are comparable to the species favoured in chumming for Pacific skipjack : *S. purpureus* and *Engraulis japonicus*. Together with *Allanetta forskali, Spratelloides delicatalus, S. gracilis* and *Herklotsichthys quadrimaculatus* (authors' *H. punctatus)* they are similar to the species composition of important bait fishes employed by a Papua New Guinea pole-and-line survey (KEARNEY, LEWIS & SMITH, 1972). Many secondary species, e.g., *Sardinella gibbosa, S. albella* and *Amblygaster sirm*, are also similar.

Fortunately, and interestingly, in was observed that the Andaman catches of *Stolephorus heterolobus* and *S. devisi* were specifically segregated station by station, but this needs to be confirmed. However, the two species are very similar and problematic, and only close comparison of several specimens of both species can reveal the differences. At present, the most practical way I have found to distinguish them is to count the tiny unbranched dorsal and anal fin rays with the help of a scalpel. *Stolephorus heterolobus* has only ii rays, but there are iii in *S. devisi* (WONGRATANA, 1980). There are bright blue green spots (or reflections) at the interorbital region of fresh specimens of the latter but these are absent in the former species. Additionally, the lateral band in *S. heterolobus* is silvery greyish, but bright silvery and relatively broader in *S. devisi*. A careful examination also reveals a thin bright blue line situated on the upper demarcation line of the bright silvery band in *S. devisi*. This is wanting in *S. heterolobus*.

The abundance of *Herklotsichthys punctatus* (should read *H. quadrimaculatus; fide* WONGRATANA, 1980) observed by YESAKI (1980) off the west coast of Phuket island and some other off-shore islands in December, 1979, is very interesting zoogeographically. The fish is only occasionally found, at a few individuals at a time, in Phangnga Bay. These might be stray fishes from deeper waters. Their scarcity there may be due to the lower salinity of the bay or the lack of prey, as well as to their open water habit. This fish is also not found in the Inner Gulf of Thailand despite its wide distribution in the Indo-Pacific region.

Table 1 lists the species found in the samples of the experimental live-bait fishing. Although it includes 44 fish species of 18 families, the list is by no means comprehensive. Further careful collecting surveys from this coast may raise the species number to 80 or more, but it is anticipated that the major species found will not differ. To make it more useful I have included in the list other baiting species tentatively identified by myself from unsorted materials formerly collected by Mr. Jet Pimolchinda and his colleagues and kept at the Phuket Marine Fisheries Station of the Department of Fisheries. In addition to the species listed, PIMOLCHINDA & SINGHAGRIWAN (1980) recently reported *Sardinella fimbriata*, *Stolephorus tri*, *S.* sp., *Decapterus maruadsi*, *Elagatis bipinulatus*, *Lutianus lineolatus*, *Rastrelliger kanagurta*, *R. faughni*, and two invertebrates, viz. *Portunus pelagicus* and *Scylla* sp., in their study of the bait fishes from the Andaman Sea by the same methods. Due to the lack of specimens of these fishes in their collections of the live baits, I have excluded the species from my list.

Table 1. Species composition of the catches of live-bait fishes. Those with an asterisk are species identified from previous collections by the same method from the same areas.

Family Chirocentridae

1. *Chirocentrus dorab* (Forsskål, 1775)

Family Clupeidae

2. *Amblygaster leiogaster* (Valenciennes, 1847)*
3. *A. sirm* (Walbaum, 1792)*
4. *Dussumieria acuta* Valenciennes, 1847*
5. *D. elopsoides* Bleeker, 1849 (authors' *D. hasseltii)*
6. *Herklotsichthys quadrimaculatus* (Rüppell, 1837) (authors' *H. punctatus* or *H. ovalis)*
7. *Ilisha melastoma* (Schneider, 1801)*
8. *Sardinella albella* (Valenciennes, 1847)
9. *S. gibbosa* (Bleeker, 1849)
10. *Spratelloides delicatulus* (Bennett, 1831)
11. *S. gracilis* (Schlegel 1846)*

Family Engraulidae

12. *Stolephorus devisi* (Whitley, 1940) (authors' *S.* species A)
13. *S. heterolobus* (Rüppell, 1837)
14. *S. indicus* (van Hasselt, 1823)
15. *S. waitei* Jordan & Seale, 1926 (authors' *S. bataviensis*

Family Synodontidae

16. *Saurida undosquamis* (Richardson, 1848)
17. *Trachinocephalus myops* (Bloch & Schneider, 1801)*

Family Hemirhamphidae

18. *Hemirhamphus balinensis* (Bleeker, 1859)
19. *H. far* (Forsskål 1775)

Family Exocoetidae

20. *Parexocoetus brachypterus* (Richardson, 1846)

Family Bregmacerotidae

21. *Bregmaceros nectabanus* Whitley, 1941*

Family Sphyraenidae

22. *Sphyraena jello* Cuvier, 1829

Family Atherinidae

23. *Allanetta forskali* (Rüppell, 1835)
24. *Stenatherina temmincki* (Bleeker 1853)

Family Mugilidae

25. *Valamugil seheli* (Forsskål, 1775)

Family Apogonidae

26. *Archamia lineolata* (Cuvier, 1828)*

Family Carangidae

27. *Alepes kalla* (Cuvier, 1831)*
28. *Atropus atropus* (Bloch & Schneider, 1801)
29. *Atule mate* (Valenciennes, 1833)
30. *Carangoides* sp. (post-larvae)
31. *Scomberoides lysan* (Forsskål, 1775)*
32. *S. tala* (Cuvier, 1831)
33. *Selar boops* (Valenciennes, 1853)
34. *S. crumenopthalmus* (Bloch, 1793)*
35. *Selaroides leptolepis* Valenciennes, 1833

Family Emmelichthyidae

36. *Dipterygonotus leucogrammicus* Bleeker, 1849*

Family Leiognathidae

37. *Gazza minuta* (Bloch, 1797)
38. *Leiognathus bindus* (Valenciennes, 1835)
39. *Secutor insidiator* (Bloch, 1787)

Family Mullidae

40. *Upeneus sulphureus* Cuvier, 1829
41. *U. tragula* Richardson, 1846

Family Pomacentridae

42. *Daya jerdoni* (Day, 1873)

Family Siganidae

43. *Siganus oramin* (Bloch & Schneider, 1801) (possibly identical with *S. canaliculatus*)

Family Scombridae

44. *Rastrelliger brachysoma* (Bleeker, 1851) (authors' *R. neglectus*)

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