Notes on the Annual Juvenile Siganid Harvest in Guam[1]

Rabbitfishes (Siganidae) are important food fishes throughout the Western Pacific. Eight species of siganids are recorded from Guam (Shultz et al. 1953; Kami et al. 1968; Kami, 1975), but only six of these have been observed near Guam within the last twenty years. Of these, *Siganus spinus* and *S. argenteus* are the predominant food fishes. Although the adults of these species are sought by the local residents, it is the juveniles that play an important part in the culture of the people of Guam. Traditionally, the annual harvesting of juvenile siganids when they first appear in the reef flats is a major village event. Based on records kept by the Division of Fish and Wildlife and according to local fishermen, the juveniles appear in the reef flats a few days before or after the last quarter of the moon (called Quarto Menquate locally) in April and May. Occasionally a third and fourth run may occur in June and October, again during the last phase of the moon.

When they first appear in the reef flats, these juveniles are called manahac hatang or manahac leso, depending on their size, by the local residents. The hatang is smaller than the leso and averages 43 mm in totall engths while the leso averages 60 mm in total length. The manahac hatang is believed to be the juvenile of *S. spinus* and manahac leso the juvenile of *S. argenteus*.

The approach of the run is usually signified when manahac are regurgitated by troll-caught tunas. On April 3, 1967 a "ball" of juvenile siganids was observed by crew members on the Division of Fish and Wildlife's exploratory fishing sampan PANGLAU ORO while anchored off Guam at a depth of 45 fathoms. A month later, the crew observed tunas chasing juvenile siganids on the lee coast of the island.

During the pelagic phase of their life cycle, these postlarval siganids are presumably plankton feeders and form large "balls" appearing reddish brown in color. Upon entering the shallow reefs, they become herbivorous and develop adult coloration. Tsuda and Bryan (1973) found that juvenile siganids are highly selective herbivores preferring benthic filamentous green algae over other algae. The local residents differentiate the plankton feeding stage (manahac) from the herbivorous stage called dage and prefer the manahac over the dage.

With the approach of the manahac run, the beaches are patrolled by the residents from early dawn to spot the reddish brown "ball" of siganids as it enters the shallow reef flats. The "balls" are either a mixture of hatang and leso or are schools of one on the other species. When "balls" are sighted, a long minnow net is used to encircle the school and pursed along the bottom lead line. Cast nets are also used to take smaller schools of siganids. The manahac is pickled in heavy brine and served either by itself or mixed with vegetables especially at the village fiestas.

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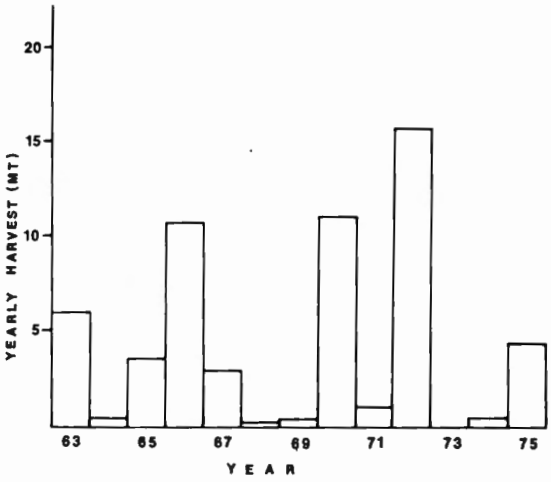

Fig. 1. Yearly Harvest (MT) estimated from Creel Census.

Since 1963, the Division of Fish and Wildlife has been conducting creel censuses during the manahac runs. These creel censuses have several shortcomings. First, the catch data are based on sight estimate of the interviewing Conservation Officers. Actual weights were not taken because most of the people are anxious to take their catch home as soon as possible before it spoils and any delay to weigh their catch was not welcomed. In spite of this handicap, reasonable estimates can be made. Most of the manahac are put into cotton or gunny sacks. A sack full of manahac varied in weight from 45.4 to 49.9 kg (100 to 110 pounds). Hence, 45.4 kg was used as a standard equivalent weight for a full sack.

Second, it is not possible to obtain a complete island wide coverage of the run. Therefore, the catch report is usually an underestimate. Because of a high degree of variability associated with each run, the catch data were not subject to quantitative analysis. However, the total harvest is a fair estimate of the relative magnitudes of the annual runs.

Figure 1 presents a thirteen year harvest record which shows wide variations in the annual total catch. A single-sample runs test for trends data (Sokal and Rohlf, 1969) showed that the sequence of the yearly variations did not differ significantly from randomness. There was no significant tendency toward regular cycling or continuously increasing or decreasing trends. In the 12 years following the initial year, there were 8 sets of consecutive increases or decreases so $t_s=(8-[2\cdot12-1]/3)/([16\cdot12-29]/90)=.25$. Five of the thirteen years (1964, 1968, 1969, 1973 and 1974) show exceptionally low harvests with 1973 amounting to less than 0.1 metric ton. Curiously, the run preceding 1973 was exceptionally high. As a result of this unusually large run in June 1972, the schools of dage remaining on the reef flats depleted their food source and mass mortality caused by starvation became evident in several coastal areas (Tsuda and Bryan, 1973).

Based on data combined from 1963, 1965 and 1972, 454 gms of manahac hatang

consisted of an average of 487 individuals while and equal weight of manahac leso comprised an average of 235 individuals.

Although the harvesting of juvenile siganids may appear to be an unwise conservation practice, if left unchecked, the millions of juveniles invading the reef flats will soon deplete their food source and succumb to starvation as they did in 1972. It is evident that the reef flats cannot sustain these masses of manahac for a prolonged period. The annual harvesting of manahac, therefore, serves a double function of satisfying the culturally bound gastronomical needs of the people as well as rendering biological control from over-grazing of algae. However, it would be prudent to investigate the optimum harvesting limits of this natural resource which varies greatly from year to year.

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