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What do you know about siganids?

(The following basic information about siganid were mostly taken from ***Biology and Culture of Siganids*** *by MN Duray, published by SEAFDEC/ AQD in 1990 and* ***A Fundamental Study on the Seed Production of the Rabbitfish*** *Siganus guttatus by S Hara 1987, a doctoral thesis submitted to the University of Tokyo).*

Biology

Siganids or rabbitfish are identified by their deep, compressed body, snout resembling that of a rabbit, 13 pungent spines in the dorsal fin, seven spines in the anal fin, and two spines in the ventral fin. The skin is leathery but the scales are smooth, small and closely adherent; hence, the fish is often mistaken as without scales. The color is olive-green to brown depending on the species.

Identification of rabbitfish is difficult because of the few morphological differences between species. Available descriptions for species differentiation rely largely on coloration of live fish. But colors change with age and emotional state of live material, as well as in death, and with method of preservation of the fish.

Rabbitfish are subdivided into two groups based on behavioral characteristics, coloration, and habitat. One group includes species that live in pairs, are site-tenacious, brightly colored and associated strictly with coral reefs. These coral-dwelling species are fragile, sensitive to physico-chemical changes and usually show interspecific aggressive behavior (*S. corallinus*). The other group includes species which school at some stage in life, move over substantial distances, and are gray or drab. They are sturdy and apparently resistant to considerable variations in salinity and temperature. These schooling species are important food fishes and currently the subject of a number of mariculture studies.

Larvae of rabbitfishes are pelagic and common in waters beyond the outer reef, but do not wander as far offshore as do larvae of migratory coastal species with pelagic eggs. Juveniles and adults occupy very diverse shallow water habitats including coral reefs, sandy and rocky bottoms with or without vegetation, lagoons and river mouths, and mangrove swamps. Only *S. argentus* has been seen in the open ocean.

Reproduction

There is no known external feature to distinguish the sexes of rabbitfishes except during the breeding season.

Some rabbitfish species mature in captivity when environmental conditions are favorable and food is adequate. Sexual maturity is attained in less than a year but at different sizes in various species.

Artificial propagation

Natural spawning of captive fish has been observed in various species. Tidal level is the most important factor in the spawning (*S. canaliculatus*) and spawns when the tide recedes. Spawning at night in the open water near the surface was reported in Ecological Studies on the Philippine Siganid fishes in Southern Negros, Philippines by Laviña & Alcala and published in 1974.

At SEAFDEC/AQD, *S. guttatus* spawns monthly in 6 m diameter canvas tanks with little change in water level. Natural spawning follows a lunar cycle (2-3 days after the first lunar quarter the whole year round).

Rabbitfishes have been successfully induced to spawn spontaneously by hormonal treatment although the response to hormonal injection depend on the stage of oocyte development.

Fry and fingerling culture

Juveniles resemble the adults in body shape and color, and may or may not live in the same habitat as the adults. The period during which the juvenile stage is reached varies with the species. Rate of transformation is affected by temperature, type of food given, etc. Groups of juveniles occur in certain coasts at predictable time of the year.

Rabbitfishes are generally tolerant to wide salinity changes and can survive reduced oxygen concentration. The variation in

tolerance to low oxygen is related to the differences in metabolic rate among species.

Growth of fry and fingerlings is generally slow and the average growth rate of the same species varies with the holding system. During culture, growth may be faster at some periods and slow in others with highest values at 5.0-6.5 g/week for all the species studied.

The suitable stocking rate in ponds is 50 fish/m^2. Growth is faster but survival is lower when rice bran is fed. Lumut (filamentous green algae) is a better food than lab-lab (a complex of blue-green algae, diatoms, bacteria, others).

Fisheries

Traditional rabbitfish fishery has existed in countries such as Guam and the Philippines where the market value of the fish is high. In the Philippines, rabbitfishes are among those caught in insular demersal fishing .

Aquaculture

Since the recognition of the potential of rabbitfish for mariculture, a great deal of studies have been done on the reproduction and/or larval rearing of the different species of siganids. However, successful results of larval rearing to the juvenile stage were obtained in only four species, i.e. *S. lineatus, S. vermiculatus, S. fuscescens and S. guttatus.* To establish technology for the seed production of siganids there are various biological aspects to be studied.

Wild fry of some siganid species have been traditionally farmed in ponds in the Philippines and yielded promising results. There are, however, limited information to come up with a culture system for the fish.

Not all species of siganids can be cultured hence acceptability and viability of the species need to be identified before its culture.

A market survey should be done to identify factors affecting the market value and acceptance of various species in the different regions - such as palatability and abundance - in order to provide a rational basis for selection of species to be cultured.

Juvenile siganids occur in great abundance during certain seasons in the Indo-Pacific and maybe collected easily. They are not being utilized in some regions especially in Singapore-Malaysian regions. In the Philippines, they are made into food paste or "bagoong" - a wasteful practice because they can be utilized more if allowed to grow to a marketable size.

Problem areas

The status on the five major problem areas identified by the Siganid Mariculture Group in 1962 are the following:

Species Survey. Although earlier work has been on the species identification, surveys are needed to identify the factors affecting the market value and acceptability of various species.

Juvenile-to-Adult Farming. A number of studies on farming juveniles in different holding systems have yielded conflicting results. Since the fish in captivity accepts any kind of food, cheap and locally available feed should be tried. There is a need to study the nutritional requirements and the growth and survival of fish under different feeding regimes. Culture techniques in ponds, cages, and pens should be developed.

Fry production. Natural or induced spawning of *S. guttatus* have been reported. The effects of environmental factors, natural food and type and size of tanks on fry survival , and the nutritional requirement of larvae and food requirements of broodstock in relation to size need to be investigated.

Fry are available in great quantities during particular periods but methods for their capture, handling, and transport should be standardized. Fry collecting grounds should be identified and described.

Diseases. The limited space and high stocking densities in intensive culture systems result in mass infection or infestation of the culture fish with parasites. Control measures must be provided to avoid fish mortalities.

Production Economics. There is a dearth of information on the economics and sociocultural aspects of rabbitfish farming. More efforts in this field is necessary.