EDIBLE CRABS OF KENYA

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ABSTRACT

This is a short paper on the edible crabs of Kenya especially *Scylla serrata,* their present state of exploitation, distribution, abundance and biology. Preliminary investigations have shown that the crab resources are under exploited. Research is therefore needed into the available stocks, methods of harvesting processing, marketing and their biologies.

INTRODUCTION

The mud crab *Scylla serrata* (Forsk) is the common edible species of Kenya. However other portunids such as *Lypa pelagica, Portunus pelagicus* and *P. sanguinolenta* are also caught in small numbers, these are often consumed by the fishermen so rarely appear for sale.

Although man consumes many species of crab including species of the families; Lithodidae, Macidae, Caneridae, Portunidae, Xanthidae, Potamidae, Geryonidae, Gecarcinidae and Ocypodidae, and though many of these are found in Kenya, only certain species have the qualifications of an important food resource. These qualifications are that; the crabs must attain a reasonable size (otherwise eating them could be tedious); others are abundance, good flavour and a ready market. *Scylla serrata* attains a reasonable size and is reported to have a delicious flavour and has a ready market.

Though the crab fishery in Kenya is still in its infancy, it is underexploited. Research into the abundance, biology, ecology and distribution of the edible species is essential to its development.

DISTRIBUTION

Scylla serrata is found all along the mangrove swamps of the Kenya coast. The largest landings are at Shimoni, Vanga, Majoreni, Ngomeni, Gongoni and Karawa. Small landings also occur at Malindi, Kilifi and Lamu fish markets. *Lupa pelagica* has only been found at old port Mombasa fish market.

GENERAL BIOLOGY OF *SCYLLA SERRATA*

Scylla serrata (Forsk) (Swahili Kaa Koo) is a decapod of the family Portunidae (swimming crabs). It is a mangrove species which remains buried in its burrow during the day emerging to feed intermittently throughout the night. The feeding behaviour of this crab has been shown to be affected by factors such as temperature and salinity (Hill, B.J. 1980) these paremeters fluctuate with the seasons so that the abundance and distribution of these crabs and therefore their catchability will have a seasonality.

Although this crab is scavenger and herbivore it is a very efficient predator equiped with strong, sharp-toothed chela which are well adapted for rapid snapping movements required for capturing and crushing prey. Food handling is specialized, each of the dimorphic chelae performing a special function. The thrust delivered by its swimming paddles is also sufficiently great for it to be able to chase prey through the water or to dash from the bottom and size it. Preliminary studies done on stomach contents of a few crabs from Vanga revealed plant matter, shell fragments similar to the shells of the mussels attached to the mangrove roots and a great amount of amorphous matter.

Like most decapod crustaceans *Scylla serratas* is dioecious with slight sexual dimorphisms especially associated with the abdomen; male abdominal segments being narrower than female ones. This is a functional characteristic since female crabs carry their eggs underneath the abdomen. Measurements of some male and female chela from Vanga showed no significant difference in size between the sexes.

Due to the presence of an exoskeleton, growth in crabs proceeds in a series of moults. Since it is difficult to mark crabs and follow them through several moults, the question of how old a crab is, is a difficult on to answer. The number of moults before a crab becomes full grown depends on the increment at each moult and the frequency of the moulting. The increment at each moult is expressed as a percentage of a pre-moult dimension such as carapace width. In this way a rough measure of the age of a crab can be calculated. Since increments vary and do not remain constant during growth, usually becoming smaller as the crabs become larger this measure is not very accurate. However the growth trends of *Scylla serrata* in Kenya have as yet to be studied. During moulting and just after when the crabs are in the soft shell stage, they are at their most unlnerable and high mortalities occur then. This is another important factor affecting the yields during the moulting season, since some of the crabs are preyed upon and most go into hiding.

Sexual maturity in crabs is hard to define, but is usually assumed to be that intermoult phase during which adult crabs can first mate successfully (Hartnoll 1969). Mating in tropical species may occur a number of times during the year and fertilization is internal. Egg laying usually occurs several days after mating due to the presence of plug on the spermathecea and the maturation of the ovaries. The females make a seaward migration to spawn and this may demonstrate a lunas periodicity especially around the time of the full moon.

Larvae are extruded and become part of the planton, these got through a number of larvae stages before migrating back inland as juveniles. The breeding behaviour of *Scylla serrata* is another area needing research since this also effects distribution and abundance and therefore the yields.

Handings of *Scylla serrata* recorded at Vanga from January 1981 to May 1981 showed the average size of marketable crab to be 138.6 mm carapace width with a range of 101 - 198 mm. The weights varied between ½ - 1½ kg. The sex ratio was 1 : 2.76 females to males which reflects some of the points mentioned above about breeding behaviours affecting distribution. Other factors that could be reflected by this ratio are behavioural differences and population movements involving one sex.

CRAB FISHERY

The biological characteristics of crabs puts some constraints on the method of capture, how they are held, processed and transported to market. It is essential to capture them with a method that does not cause bodily injury or loss of appendages since this reduce their value Death or weakness causes irreversible changes of the flesh and adversely affects the texture, appearance and flavour of the meat. The season and time of capture is also very important since the quality and yield of post - moult crabs are low.

In Kenya most of the crabs are harvested using age old artisenal methods which are very labour intensive, so that crab fishing only supplements pisces fishing. Fishermen go out of their burrows. The chela are tied to avoid injury to the fishermen, customers and the crabs themselves and the crabs are packed into reed baskets. These baskets provide plenty of ventilation so the crabs don't suffocate before reaching market. Small numbers of crabs are caught in nets and traps set out fot fish by the fishermen. Experiments done in Tanzania by Heath (1971) indicated that the most effective traps for catching *Portunus pelagicers* was the local reed trap madema also commonly used in Kenya. No satisfactory trap design however was found for *Scylla serrata*. This is therefore another important area for research.

Although crabs can be sold alive, cooked fresh and frozen and as canned products the bulk of the crabs in Kenya are purchased live in which case the value of the crabs depends on their condition at the time of sale. When the journey to the market is long losses may be sustained. In areas like Vanga and Shimoni where yields are high but the market poor, crabs have to be transported long distances to the customers. Crabs can stay alive for a long time as long as the gills and soft parts of the shell are wet, so a well venticated box kept wet or a wet sack could be quite effective, ice could also be used. However the best method to be adapted is the cheapest which will ensure the arrival of the bulk of the crabs in good condition. In general this is achieved by packing the crabs closely to avoid jarring, and fighting. No special packing is needed since this represents an initial expense in both material and labour, an additional non-productive weight to be paid for in transit. This is important since the major markets are in the towns catering to the tourist hotels and restaurants and the fish shops.

Due to the low yields and also since crab is seen as an exotic meal by the majority of the local people, crab is quite expensive. It is hoped that with the development of this industry and the enlightment of the people to the delicious and also nutritions properties of crab, the price may become competitive with animal meat. However with the increased exploitation of crabs due to increased demand, certain regulatory measures will have to be ade to keep exploitation at an optimum level. Regulations for example should be made whereby undersized crabs, berried females and recently moultied crabs shall be returned to the sea. Soft crabs in any case do not keep well so it is to the interest of the fisherman that such returned crabs survive to be available for subsequent recaptures. Alternatively if the yield exceeds the needs of the local market, crab could be exported forming a valuable means of foreign exchange.

DISCUSSION

Through a great deal of information has been collected over the past decade on the distribution, abundance and availability of living resources along the Kenya Coast, very little information of this kind on crabs is available. There is therefore an urgent need for research into the biology, distribution, abundance, processing and marketing of crabs in Kenya and I have tried to outline some of these areas of research in this paper.

There is a strong market for crabs in the high income areas of the world and this market can be exploited by Kenya. Ways for increasing yields for example improved methods for harvesting and crab culture should be researched. Other possibilities include mass rearing of baby crabs for release in the sea to stimulate crab population.

Kenya is developing at a very fast rate and has a high population growth. Already a great deal of strain is being put on the development of animal protein. Fisheries development is therefore very important in the overall development of the country.

There is therefore a need to collect and collate information concerning the various stocks available and the status of exploitation. Therefore as the production of crabs increases there will be a need to improve the quality of the product as well as improve hardling distribution and marketing. However any improvements should be done bearing in mind the impact of changing fish technology on existing artisanal fishermen and the means of minimizing the detrinmental aspects of fisheries modernization on them should be proposed.

REFERENCES:

Averson, F.G. 1971. International trade - crab FAO/UNDP/10FC/DEV/71/66

Barnes, R.D. (1973). Invertebrate Zoology Ed W.B. Saunders Co; Phil 743P.

F.A.O. Fisheries technical paper No. 115. Revision 1 Manual of fisheries science. Part 2 - Methods of resources investigation and their application. FIRS/T 115(Rev. 1)

Hartnoll, R.G. 1968. Mating in Brachyura *Crust 16: 161 - 181.*

Health, J.R. 1971. Some preliminary results of trap fishing trials for crabs. *East African Agricultural and Forestry Journal: 142 - 145*

Hill, B.J. 19796. Biology of the crabs *Scylla serrata* (Forskal) in the St. Lucia system. *Trans.roy. Soc. S. Afr., 44, part 1: 55 - 62.*

Hill, B.J. 1980. Effects of temperature on feeding and activity in the crab *Scylla serrata. Marine Biology 59,: 189 - 192.*

Macnae, W. 1968. A general account of the fauna and flora of mangrove swamps and forests in the Indo-West-Pacific region. *Adv. Mar. Biol. 6: 73 - 270.*

Malley, D.F. 1977. Adaptations of decaped crustaceans to life in mangrove swamps. *Mar. Res. Indonesia 18: 63 - 72.*

Milne, P.H. 1972. Fish and Shellfish farming in Coastal waters. Fishing News Books Ltd. 208p.

Rees, G.H. 1963. Edible crabs of the U.S. us. Fish and wildlife service, Fishery leaflet 550. 18p

Sparks, A.K. 1965. A report on the potential of the Marine shellfisheries of Kenya. U.S.A. I.D. Nairobi: 1 - 33.