

# Research on Deepsea Red Crab after more than 20 Years of Exploitation

By Louise le Roux

The deepsea red crab, *Chaceon maritae*, is a benthic animal occurring along the entire westcoast of Africa from the West Sahara to Namibia. The species is commercially fished off Namibia, the Ivory Coast and Angola.

The highest density of red crab in Namibia is in the northern area of its distribution, from the Angolan border down to 18°S. The largest animals occur only in the southern area (20° to 23°S), where the density is lowest. Red crab occurs at depths of 350 to 960 metres in waters of less than 10°C. Most females occur in waters of 350 to 500 m depths, while males become more dominant in deeper water. The size of the animals, especially the males, tends to decrease with an increase in depth.

Deepsea red crab is slow growing with males being generally larger than females. Males can grow to 160 mm carapace width, while females generally reach only 115 mm carapace width. It takes a male about 25 to 30 years to reach maximum size. Sexual maturity is reached at a size of 82 mm for males and 84 mm for females. Animals enter the fishery when they are between seven and nine years of age.

## Crab fishery

Red crab is caught by baited Japanese style traps on longlines (See figure 1) with 400 to 500 traps per line. Longlines are usually left in the water for 24 to 120 hours, and sometimes longer. The catch is processed on board fishing vessels into various products. Larger crabs are used for producing sections and claw products, medium sized animals are processed into leg products, while smaller crabs and discards from other products are used to produce flake. The



products are mainly exported to Japan. The export value in 1994 stood at N\$33,8 million.

Deepsea red crab has been exploited off the Namibian coast for more than 20 years. The fishery started in 1973 with three vessels which landed a total of 3 877 tons of whole mass crab. In the following year, the number of vessels increased to 17, but decreased again in subsequent years. During the 1980s five to seven vessels were exploiting the red crab stock, and during the 1990s the number declined to three or four.

Catches of red crab have only been recorded since 1980, and apart from information about the catch for 1973, only rudimentary catch data exist for the period before 1980. In the 1980s catches of deepsea red crab increased to a level of 10 000 tons of whole mass crab in 1983. In the following years catches were at 6 000 to 8 000 tons of whole mass crab. From 1989 to 1990 catches decreased drastically to a level of 2 000 to 4 000 tons. Since 1990 catches have remained fairly constant at about 3 000 tons.

## Research on deepsea red crab

The Crab Research Section consists of one scientist and two technical assistants. Research is aimed at determining stock size and structure in order to advise management on the optimal use of the species. Regular sampling of red crab takes place on board commercial vessels to determine the structure of the stock in commercial catches. Commercial catch statistics are also monitored on a continuous basis.

During sampling surveys, information is recorded on crab size, sex ratios, moulting cycles, female maturity and egg production. Information on the size structures, sex ratios and

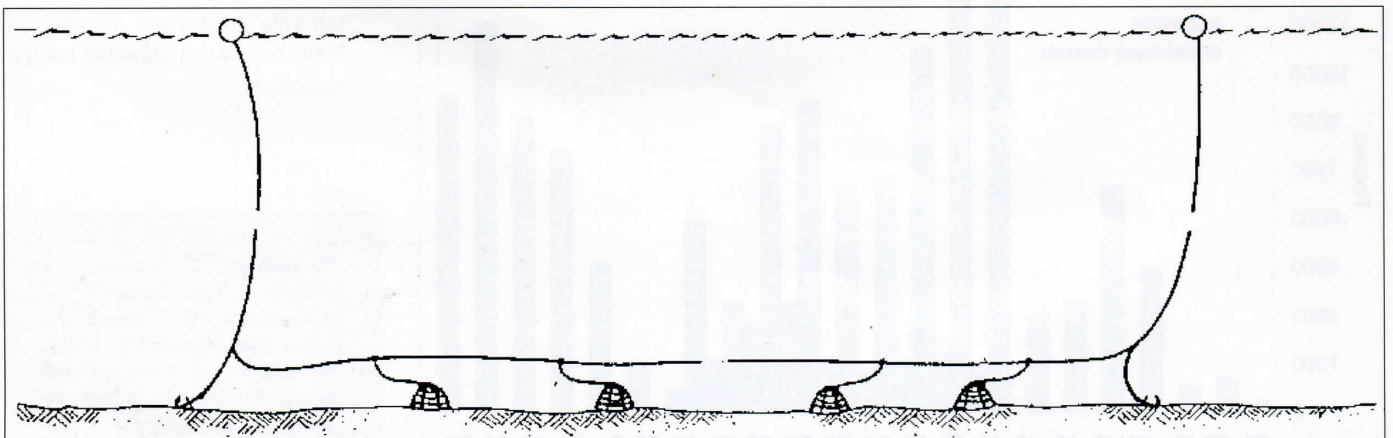
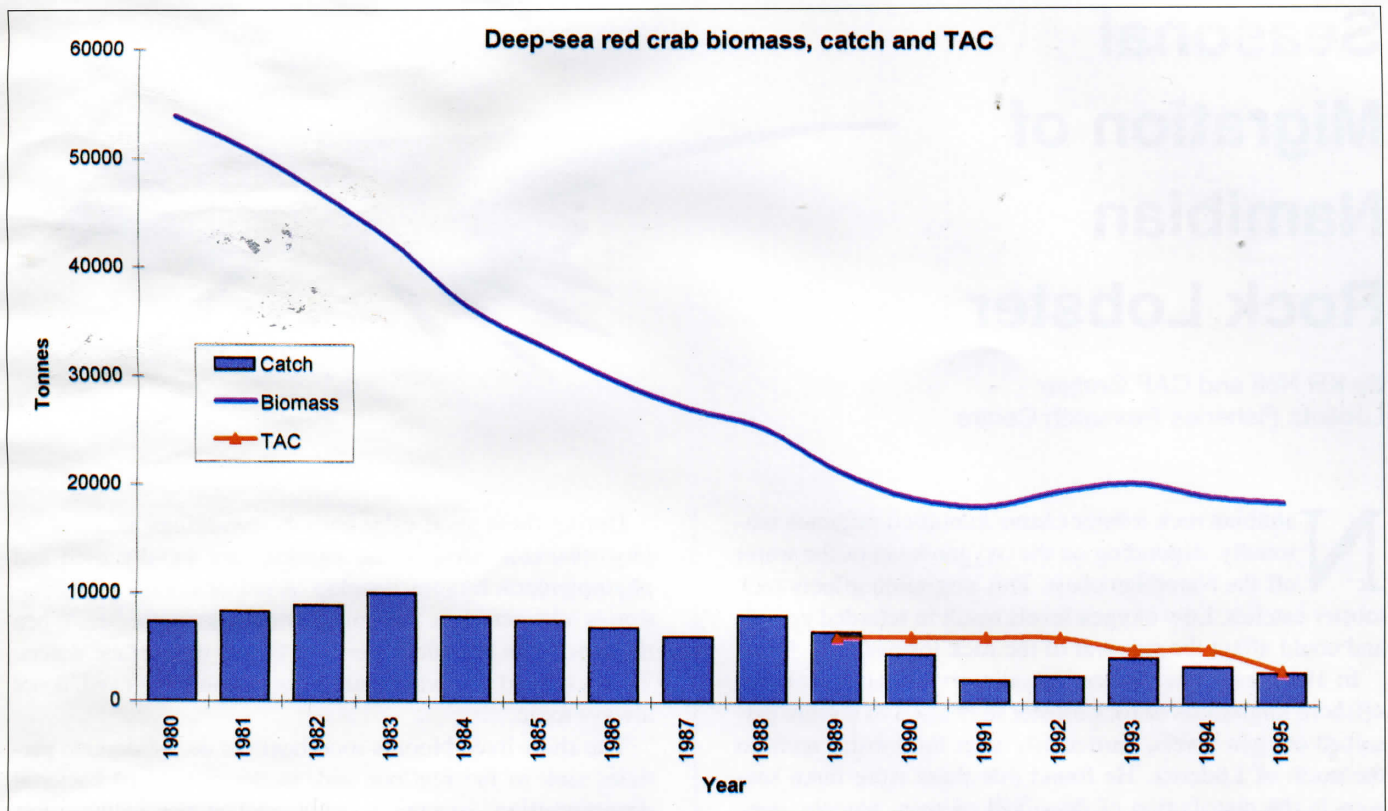


Figure 1



catches is used to determine the total crab catch of the year in number of animals.

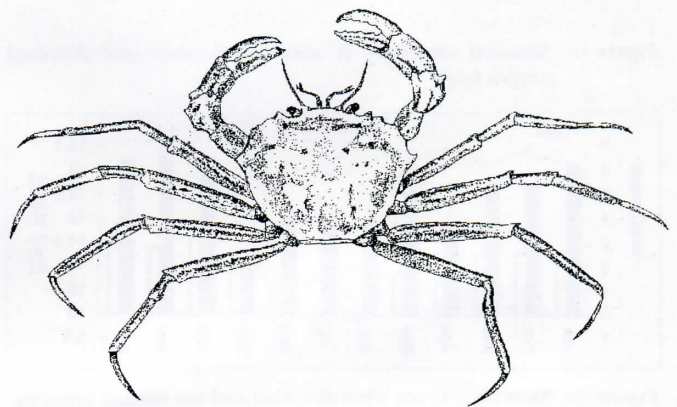
Since 1991, annual tagging surveys have been carried out. Tagged crabs are caught by commercial vessels and returned to the Crab Research Section with information on where and when they were caught. Tag returns are monitored closely to determine the stock size of deepsea red crab and to study individual growth and migration patterns. A substantial number of crabs tagged in Namibia are being captured in Angola, which indicates that the Namibian and Angolan red crab is from one stock and should ideally be managed as such. Information gathered on the growth can directly be linked to the production of the stock and used in other methods for assessing the red crab stock.

Preliminary trap surveys since 1994 will become a regular feature in deepsea research. The surveys aim at gathering information on recruitment into the fishery and to examine mesh size regulations designed to exclude juvenile animals from the catch.

The stock size is also determined by two mathematical models, namely the holistic and the analytical approaches. Holistic models are mainly surplus production models, which use historical and present catch and effort data from the commercial fleet to determine the stock size. The analytical, known as the cohort analysis and the prediction models, use information on the number of animals caught, the structure of the stock, growth (from tagging information) and natural mortality. Cohort analysis determines an estimate of stock size and biomass of the red crab and examines the fishing pattern of the fleet, namely the proportion of each size category in the catch. Once the fishing pattern of the fleet is known, prediction models are used to determine whether the stock is being overfished or not, and at what level the stock can be harvested on a sustainable basis in the long term. Information on recruitment into the fishery is

also gathered from cohort analysis, and together with the fishing pattern of the fleet can be used to make short-term projections on the biomass of the stock subjected to various harvesting models.

Results from the analytical models and biomass projections determine the number of crabs which can be harvested in the following year. From these results recommendations are made to the Ministry's management for the setting of total allowable catches.



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