THE STRUCTURE AND FUNCTION OF KRAAL, A FISHING GEAR, IN A SRI LANKAN LAGOON

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ABSTRACT

Prawn is the major fishery in the Rekawa lagoon and "Kraal" is the major fishing gear, which is a built-in fishing-trap made of plant materials operated in the shallow regions of the lagoon. The Kraals are of different types. Their structure, distribution and method of operation are given in the note.

The Rekawa lagoon is a coastal lagoon, which has an area of about 197 ha. A belt of mangroves encircles the lagoon almost completely. Prawn fishery is the major fishery in the lagoon and 'Kraal', a built-in fish-trap, is the major gear employed in the fishery.

A map of the lagoon (Fig. 1) having been prepared based on aerial photographs provided by the Survey Dept (1982, 1983), the distribution of Kraals was marked based on actual measurements. Approximate duration of operation of each Kraal was recorded by observation. Information on raw material, building, operation and reparation of Kraals was collected. Catches were sampled on the spot and were later analysed in the laboratory.

Prawns were identified following Kurian and Sebastian (1982) and fishes were identified following Munro (1955), and their lengths and weights were measured.

Structure of the Kraal: Kraal is an unbailed fishing trap built in shallow areas of the lagoon. The major parts of the Kraal are the fencing portion and the enclosure; the fencing diverting the animals to the enclosure, where they are trapped. Different types of Kraals are reported from different parts of the world (Day 1981, Kurian and Sebastian 1982, Zaouali 1984). Kraals in the Rekawa lagoon have three major components, namely guides, walls and skeletal poles. Walls supported by skeletal poles form the basic structure of the Kraal and they do most of the fencing and trapping of animals. Guides, besides doing the function of fencing, expand the size of the Kraal (Fig. 2).

Guide is a long straight fence made of mangrove twigs implanted in the shallow regions of the lagoon (Fig. 2). It is built either perpendicular to the
Fig. 1. (A) Major climatic divisions of Sri Lanka (Mueller-Dombois 1968) and the location of the Rekawa Jagoon. (B) Major hydrographical divisions of the Rekawa lagoon and its surroundings.

Bank connecting the bank and the walls of the kraal or parallel to the bank as an extension of the walls (Fig. 2). A guide is not costly or laborious to build. Usually, brushworks of twigs of *Lumnitzera racemosa* (a mangrove) are used in building guides. Twigs are implanted tightly one after the other along a straight line, the bottom sediments keeping them in place. The height of the guide is about 0.5 m, which height is sufficient for the guide to act as a barrier since the water column is less than 0.5 m deep. Twigs at the time of implantation are with branches and leaves; the leaves, however, are shed later. The length of guides ranges from a few meters to 30 m.

Wall is the most essential component of a Kraal. It is made of mid-ribs of date palm (*Phoenix zeylanica*) leaves. A Kraal needs 3000-12000 mid-ribs to make a wall. The wall is made by weaving mid-ribs parallelly with the aid of 3-5 strands of coir ropes (Fig. 2). Such 10 m lengths of walls are fastened onto skeletal poles implanted in the mud. *Aegiceras corniculatum* and *Ceriops tagal* (both mangrooves) branches are used as skeletal poles and the bast of *Hibiscus tiliaceus* (not a mangrove) is used for threads for fastening walls to skeletal poles. Walls supported by skeletal poles give a systematic configuration to the Kraal. Walls protrude about 0.5 m above the water.

A Kraal has a number of compartments (Fig. 2). 'Funnel' is the largest compartment, which has a large opening at one end and a smaller one at the
FIG. 2. (A) Special distribution of a typical Kraal and terminology of its components and compartments. (B) Components of a Kraal and their dimensions. (C) Harvesting net and the contour of the inner wall of a focus at one of the corners (broken line).

opposite. The latter opens into a semicircular 'verandra', which in turn extends to form a triangular 'corridor' opening into an 'interfocal corridor'. 'Focus' is the most important compartment of a Kraal. A typical Kraal has an 'after-focus' in addition to the focus. The 'focus' and the 'after-focus' are identical in size and shape, but always their mouths face each other. The interfocal corridor opens into the focus and the after-focus by two narrow vertical openings. From funnel to foci, the various openings between compartments diminish in size. The compartments are aligned in such a way that the mouth of each protrudes into the next so as to act as a one-way, valve-like passage (Fig. 2). The size of compartments also decreases from funnel to foci.

Guides contribute to the size of the funnel. A guide when built perpendicular to the bank is referred to as funnel guide, whereas, when it is parallel to
the bank, it is referred to as extra-local guide. Sometimes Kraals are built without guides or after-foci, or a Kraal may have an extrafocus, or even two Kraals may be built in combination (Fig. 3).

Kraals are built where the depth of the lagoon is ideal and the density of prawns is likely to be high (Maitipe 1985). For this reason, Kraals are operated only seasonally; during the off-season, they are dismantled, repaired and kept away on the banks.

The Kraals built regularly year after year (during the fishing seasons) in the same place of the lagoon are referred to as permanent Kraals and the Kraals built only now and then are referred to as temporary Kraals (Fig. 4). Number of Kraals and their shapes are changed from time to time depending on the availability of prawns.
Kraal catches are harvested once or twice a day (usually early in the morning and during the mid-day) by scooping out the animals entrapped in the foci with hand nets (Fig. 2).

**Functioning of Kraals:** Kraal is a passive fishing year. Therefore, its efficiency depends on the density and mobility of available prawns and fish. The animals, obstructed by the guide and the wall, swim along these to the funnel. Animals can pass through the guides, which, however, they rarely do when moving in shoals, but animals larger than 5 mm cannot pass through the walls.

Prawns and finfishes enter into the funnel of the Kraal directly or after swimming right round the Kraal along the outer walls, depending on the direction from which they approach the Kraal (Fig. 2). 'Veranda' deflects the course.
of swimming of the animals at an angle of 180°, after which the animals accumulate inside the interfocal corridor, and, finally they are led to be entrapped in the foci. Entrances between compartments in the foci, functioning as one-way valves, prevent the trapped animals from retreating, and the gradually decreasing width of the successive entrances efficiently entrap many successive concentrations of animals in the foci. When the foci are over-saturated, some of the animals may escape through the entrance, but they too are re-directed by the interfocal corridor towards the focus or afterfocus.

Composition of the Kraal fishery: The most abundant species found in the Kraals is the commercially most important one, *Penaeus indicus*, *Metapenaeus monoceros* is also caught periodically. The mean total length and the mean weight of *P. indicus* caught are $11.8 \pm 0.49$ cm and $10.2 \pm 1.4$ g, respectively, whereas those of *M. monoceros* are $8.3 \pm 0.73$ cm and $0.1 \pm 4.59$ g. Prawn production of the lagoon is about 5 metric tons per year, of which 3.4 metric tons come from kraals (Maitipe 1985).

The bycatch is not very profitable because the finfish species with which it is mainly constituted have a low market value. The various species that constitute the bycatch are (the mean size in cm in brackets): *Muraenox cinereus* (120); *Ilisha elongata* (9.0); *Nematolosa nasus* (21.7); * Macronus vittatus* (7.8); *Puntius vittatus* (4.8); *Carangoides malabaricus* (7.3); *Etroplus suratensis* (10.0); *Srotherodon mossambicus* (10.5); *Gerres* sp. (7.1); *Gerres setifer* (7.3); *Gobius tentacularis* (10.3); *Leiognathus equulus* (17.0); *Leiognathus* sp. (8.1); *Leiognathus* sp. (7.3); *Ephinephelus tauvina* (43.5); *Siganus javus* (7.5); *Eutherapon* sp. (11.4); *Brachirus orientalis* (11.5); *Tetradon* sp. (13.5); *Triacanthus brevirostris* (8.2); *Macrobrachium javanicum* (5.5); *Metapenaeus dobsoni* (10.0); *Penaeus latiscutatus* (8.1); *P. monodon* (19.0); *P. semisulcatus* (10.5); *Scylla serrata* (9.6).

Raw materials used to build kraals are generally durable and they are used for about 2 years repeatedly. Small amounts of fresh material may have to be added from time to time in case of reparation or expansion. An unlimited number of Kraals cannot be built in the lagoon. For this reason, Kraals do not eliminate the surrounding vegetation, and the natural regeneration of mangroves and other plants can automatically replace the loss.

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NOTES

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