were also worked out and compared. Our results showed that the 16 indices of diversity studies can be grouped into 8 complimentary group(s) of diversity i) N1, N2, Heip, 1- λ and $H'_{(loge)}$ ii) S, sDelta+ and sPhi+ iii) Phi+ iv) BP v) Evar vi) d and Delta vii) Delta* and Delta+ and viii) Lambda+. Significant difference ($p<0.05$) were found to exist between the different trawl systems in the mean diversity values except for Taxonomic diversity, Taxonomic distinctness and average taxonomic distinctness. Species composition showed that there was not much difference in the species that was captured by the different trawl systems. The study concludes that bycatch diversity is of a multi-component nature and simultaneous analysis of different indices based on richness and taxonomy is essential to capture the different facets of bycatch diversity. This study is one of the first of its kind along the Northwest coast of India that studied the multi-component structure of bycatch diversity and can be used as a benchmark data for evaluating the biodiversity level impact of different trawl codend mesh sizes along Northwest coast of India.

**FS PO 05**

## Development of a grid for separation of squilla from shrimp catches– preliminary results

V.R. MADHU*, PARAS NATH JHA, M.P. REMESAN

ICAR-Central Institute of Fisheries Technology, CIFT Junction Matsyapuri, Willingdon Island, Cochin, India;
**madhucift@gmail.com*

Shrimp trawling contributes significantly to the total marine fish landings along Indian coast. But, the generation of bycatch is often high and about one third of the fauna caught, are discarded during trawling for shrimps. Changes are made to the shape/size of the codend and mechanical structures (grids) are introduced, to exclude non-targeted catch. Along Kerala coast, the abundance of shrimp and squilla coincides and it becomes difficult to segregate the shrimp from squilla which forms a discard. An oval shaped grid made of stainless steel was developed based on the premise that squilla would swim up and enter the upper codend whereas shrimps would enter the lower codend through the grid spaces. The lower part (65% of the total height) of the grid had horizontal rods of 4 mm Ø spaced at 25 mm distance and upper part (35% of total height) formed a free space for the squilla to swim and enter the upper codend. The upper and lower parts of the grid ended into separate codends. A 27 m shrimp trawl was rigged with the grid and field trials were carried out off Cochin. A method was also developed for deriving the selection properties of the grid by *in-situ* method by simulating the free fall of individuals of the respective species used for study. A total of 13 hauls were tried using the gear and CPUE was 5.75 $kg.h.^{-1}$. The upper codend recorded a CPUE of 3.88 $kg.h.^{-1}$, while it was only 1.76 $kg.h.^{-1}$ in the lower codend. Anchovies (26.47%), pomfrets (24.8%), shrimps (13.58%), squids (11.03%), croakers (8.11%), carangids (5.2%), leiognathids (1.9%) and squilla (8.73%) formed the major catch. The $L_{50}$ values for *P. stylifera* were 95 mm and 105 mm respectively for the 22 and 25 mm spaced grids. The $L_{50}$ values for *M. monoceros* were 113 mm, 128 mm and 129 mm respectively for the grid spacings of 22, 25 and 30 mm. The $L_{50}$ values for squilla was lower than the shrimp species *viz*., 82 mm in 22 mm grids and 96 mm in 25 mm spaced grids. It shows that these spacing would not be enough for the separation. Grids with spacing of 25 mm and individuals of squilla with $L_{50}$ more than 13 cm would be required for effectuating the separation of species.

On-field experimental trials using grids with different spacing are required before the results can be up scaled for experimental trials in commercial trawls.

**FS PO 06**

## Bycatch and discards in stake nets off Kumbalam, Cochin backwaters, India

H. JISHA[1], SALY N. THOMAS [2]*, K.T. THOMSON[1]

[1]School of Industrial Fisheries, Cochin University of Science and Technology, Kochi, Kerala, India; [2] ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, India; *salynthomas@gmail.com*

Stake nets are important gear used for exploiting the brackish water prawn fishery of Kerala. Consequent to the uncontrolled proliferation of these nets, Govt of Kerala stopped issuing fresh licenses from 1983 onwards to install stake nets. These nets were reported to be a threat to the fishery as huge quantity of juvenile are caught. Though codend mesh size of the gear was optimized as 24 mm by ICAR-CIFT, the mesh size has been reduced over the years. In this context, an effort has been made to study the catch composition, and bycatch characteristics by selecting 11 stake nets operated off Kumbalam in Cochin backwaters. The species composition and size composition of catch, bycatch and discards were recorded fortnightly for 12 months from January to December 2012. The mesh size of the gear was six mm which is extremely small in size. Prawns constituted 98% of the catch while the rest was crabs and finfishes. *Metapebaeus dobsoni* was the dominant prawn species (91%), followed by *M. monoceros, Fenneropenaeus indicus,* and *Penaeus monodon*. Finfish catch composed of 38 species representing 24 families and six orders. Species belonging to the genus *Anchoviella*, *Ambassis*, *Cynoglossus*, *Platycephalus* and *Leiognathus* were the commercially important finfishes in the catch. Crabs were represented by *Portunus pelagicus* and *Scylla serrata*. Length frequency analysis showed 80% of the catch falling under the term `juveniles'. Finfishes, crabs and juveniles of prawns were grouped under bycatch. Targeted catch formed only 13% of the total catch and the ratio between targeted catch and bycatch was 1:6. Discards included organisms which had no market value. *Mastacembelus armatus*, a snake-like fish locally known as *thondi* was the major species discarded. Stomatopods, bivalves, jelly fish and puffer fish formed the other discards. The present study once again confirms the earlier reports of the devastating effect of the stake nets on the ecosystem. Despite the Expert Committee constituted by Government of Kerala in 2001, recommended, phasing out of the stake nets in the state by 2015, the continued operation of even the unlicensed stake nets; and the use of codend mesh size of six mm are serious problems to be addressed for the sustenance of the brackish water prawn fishery.

**FS PO 07**

## Quantitative and qualitative assessment of hook and line fishery in estuaries of Goa: a preliminary analysis

G.B. SREEKANTH[1]*, V.R. MADHU[2], PARAS NATH JHA[2], SALY N. THOMAS[2]

[1]ICAR–Central Coastal Agricultural Research Institute, Ela, Old Goa, India; [2]ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, India; **gbsree@gmail.com*

The state of Goa has huge potential for recreational hook and line fishery. Traditionally, the hook and line fishing is carried out in the Zuari and Mandovi estuaries with an estimated total area of 60