

Relative Efficiency of Trammel Nets and Simple Gill Nets - A Preliminary Study

Saly N. Thomas, A.C. Kuttappan, V.C. George, Varghese Paul and H. Krishna Iyer
Central Institute of Fisheries Technology Cochin - 682 029

This paper presents the results of comparative fishing tests with trammel nets and simple gill nets operated off Cochin. Trammel nets of polyamide multifilament with inner webbing of mesh size 34.0, 38.0, 40.0 and 50.0 mm were compared with polyamide monofilament simple gill nets of corresponding mesh size. Trammel nets and simple gill nets of 34.0 and 38.0 mm mesh size gave better results with respect to catch per unit area. Among them, trammel nets gave better output.

Gill nets have been operated for the successful exploitation of large-sized prawns (Anon, 1978 and George & Suseelan, 1980). This simple and less capital-intensive fishing technique has become very popular over the years.

Trammel nets prevalent in Andhra Pradesh and Tamil Nadu coasts were later introduced to Trivandrum coast as well (Jerold & Ebanazer, 1985). Kalawar *et al.* (1985) recommended introduction of these nets in the artisanal sector of Kerala (in 0-20 m depth zone).

Polyamide multifilament gill nets are being replaced by polyamide monofilament. Khan *et al.* (1975) have indicated that polyamide monofilament gill nets are 1.5 times more efficient in inland waters and 2.5 times more efficient in marine waters (Radhalakshmi & Nayar, 1985) compared to polyamide multifilament gill nets.

An attempt was made to test the efficiency of polyamide multifilament trammel nets and monofilament simple gill nets in order to assess their comparative performance.

Materials and Methods

Four units of trammel nets, made of polyamide 210x1x2 with 34.0, 38.0, 40.0 and 50.0 mm mesh size webbing of simple gill nets made of 0.23 mm dia polyamide monofilament of corresponding mesh size

formed the experimental gear. These mesh-size are common in the prawn gill nets of Kerala.

The design details of the gear are given in Table 1. All the experimental nets had identical dimensions. The simple gill nets and trammel nets of identical mesh size were placed in juxtaposition and operated off Cochin at depth varying from 3.2 to 5.4 m. The craft used was a plank built canoe of 6.5 m. OAL manned by a crew of three.

The above experiments were conducted during August, 1990 to February, 1991, mostly during the early hours of the day. Sixty operations were conducted and the species composition, total length and weight of individual prawns were recorded. However, in the case of fishes, observations were limited to species composition and length.

The chi-square tests with length frequency of prawns and fishes caught and coefficient of quartile deviation for the length frequency of prawns were worked out.

Results and Discussion

The main species of prawns caught are *Penaeus indicus* and *Metapenaeus affinis* contributing to 90% of the total catch. Soles, jew fishes, Engraulids, Sciaenids and mullets were the predominant groups of fishes (Table 2).

Table 1. Design details of experimental gear

Sl. No.	Type of net	Material & Twine size	Mesh size (mm)	Hanging coefficient (Horizontal)	Hung length and depth (m)	Head rope dia	Foot rope dia	Floats Specification & type	No.	Sinkers Specification & type	No.
1.	Simple gill net	Polyamide monofilament 0.23 mm	34.0	0.50	18.0x2.9	2.5 mm dia	2.5 mm dia	70x20 mm cylindrical aero plast	13	Stone of irregular shape 150-200 g each	7
2.	"	"	38.0	"	"	"	"	"	13	"	7
3.	"	"	40.00	"	"	"	"	"	13	"	7
4.	"	"	50.00	"	"	"	"	"	13	"	7
5.	Trammel net	Inner layer Nylon 210x1x2 Outer layer Nylon 210x2x3	Inner layer 34.0 Outer layer 250.0	Inner layer 0.39 Outer layer 0.61	19.6x2.9	4.0 mm dia	2.5 mm dia	"	42	Lead sinkers of spindle shape 21-22 g each	64
6.	"	"	38.0	"	"	"	"	"	42	"	64
7.	"	"	40.0	"	"	"	"	"	42	"	64
8.	"	"	50.0	"	"	"	"	"	42	"	64

Table 2. Catch data of simple gill nets and Trammel nets (Number of prawns/fishes caught)

	Simple gill net		Mesh size (mm)		Trammel net		mesh size(mm)	
	34.0	38.0	40.0	50.0	34.0	38.0	40.0	50.0
<i>Penaeus indicus</i>	376	672	544	48	464	584	368	104
	(1.79)	(5.58)	(5.80)	(0.55)	(4.34)	(5.49)	(3.74)	(1.14)
<i>Metapenaeus affinis</i>	336	248	240	40	416	288	152	8
	(1.39)	(1.16)	(1.15)	(0.21)	(2.03)	(1.65)	(0.87)	(0.04)
Total prawns	864	952	800	88	1088	960	560	128
	(4.03)	(6.80)	(7.26)	(0.76)	(9.05)	(8.17)	(6.81)	(1.18)
Sole	1928	864	440	256	2008	2192	1416	912
Jew fish	704	320	568	304	832	576	432	144
Sciaenids	592	448	184	72	656	512	184	72
Mullet	352	336	352	16	184	112	64	0
Engraulids	1152	560	170	8	424	370	56	24
Total fishes	5504	3288	2176	1080	4680	4168	2584	1456

*Figures in Paranthesis denote weight in kg

Table 3. Catch per 1000 sq m of webbing of simple gill nets and trammel nets of various mesh sizes

	Simple gill net				Trammel nets			
	(mesh size) mm				(mesh size) mm			
	34.0	38.0	40.0	50.0	34.0	38.0	40.0	50.0
<i>Penaeus indicus</i> (kg)	0.57	1.78	1.83	0.18	1.39	1.75	1.19	0.36
<i>Metapenaeus affinis</i> (kg)	0.44	0.37	0.37	0.07	0.50	0.53	0.53	0.28
Total prawns (kg)	1.29	2.17	2.32	0.24	2.89	2.61	2.17	0.38
Fishes (number)	1757	1049	694	344	1494	1330	825	464

The catch per unit area of webbing for the different nets are presented in Table 3. The output of trammel nets is slightly higher than that of simple gill nets.

Mesh size 34.0 mm and 38.0 mm of both simple gill nets and trammel nets gave better total output than 40.0 and 50.0 mm. For prawns 50.0 mm nets were least effective in both the cases. Trammel net of 34.0 mm mesh size is better than the simple gill net of corresponding mesh size.

The data available in Table 2 were further subjected to statistical tests. Chi-square test (Table 4) showed no significant difference between the performance of simple gill nets and trammel nets as per the ratio of prawns and fishes caught in the two types

of nets of various mesh size. Therefore, the efficiency of polyamide monofilament simple gill nets and polyamide multifilament trammel nets are almost equal from the cost point of view.

The coefficient of quartile deviation relating to prawns are presented in Table 5. It indicates that the variability in the size range of prawns caught in the simple gill net is less than that of trammel net establishing the selective action of simple gill net over trammel net.

This preliminary study indicates that the performance of 34.0 and 38.0 mm mesh sizes are better compared to 40.0 and 50.0 mm in both types of nets. As the output of polyamide monofilament simple gill nets

Table 4. *Chi-square test of the significance of difference in ratio of fish/prawn caught in the simple gill net and trammel net of various mesh sizes*

Prawns/fishes	Simple gill nets				Trammel nets				Chi- Square
	mesh size (mm)				mesh size (mm)				
	34.0	38.0	40.0	50.0	34.0	38.0	40.0	50.0	
Total prawns	10	20	9	1	12	11	6	1	2.740
<i>Penaeus indicus</i>	8	12	11	1	10	12	10	2	1.682
<i>Metapenaeus affinis</i>	8	6	6	1	10	7	4	0.5	0.071
Sole	8	3	2	1	8	9	5	4	7.307
Jew fishes	5	2	4	2	6	4	3	1	0.773
Sciaenids	8	6	3	1	9	7	3	1	1.303
Engraulids	20	10	3	0	8	7	1	0	0.405
Mullet	5	5	5	1	3	2	1	0	5.810

Table 5. *Co-efficient of quartile deviation of the length of prawn caught in simple gill net and trammel nets of various mesh sizes.*

Type of net	Mesh size (mm)			
	34.0	38.0	40.0	50.0
Simple gill net	11.85	10.74	8.89	15.00
Trammel net	14.67	27.93	10.40	11.39

are on par with trammel nets of polyamide multifilament, it is suggested that further in depth studies may be undertaken.

The authors are thankful to the Director, Central Institute of Fisheries Technology, Cochin for permission to present this paper and the Head, Fishing Technology Division, for useful comments and suggestions at various stages.

References

Anon (1978) *Project for Development of Small-scale Fisheries in the Bay of Bengal*,

Development Report on Indian Ocean Programme, 44(2) WP 13, 1

George, M.J.Suseelan, C.(1980) in *Proceedings of the Symposium on Development and Management of Small-scale Indo-Pacif.Fish.Coun.19(3)*, 402

Jerold, J.J. & Ebenezer, I.P. (1985) *Marine Fisheries Information Service*, No.63, CMFRI, Cochin

Kalawar, A.G., Devaraj, M. & Parulekar, A.H. (1985) *Report of the Expert Committee on Marine Fisheries in Kerala*, 429 p.

Khan, A.A., George, N.A.& Pandey, O.P.(1975) *Fish.Technol.12*, 64

Radhalakshmi, K. & Gopalan Nayar, S. (1985) in *Harvest and Post-harvest Technology of Fish*, Society of Fisheries Technologists (India), Cochin, p.262