

STANDARDISATION OF SPECIFICATIONS FOR DIFFERENT TROLLING LURES

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Fishing experiments were conducted with buffalo horn, wooden and galvanised iron jigs of different lengths and weights rigged in troll lines. It was observed that jigs with 12 cm length and 60 g weight were superior to others in luring seer fish. Fish head jigs of 60 g weight showed a higher efficiency index than those of 50 and 70 g tried in these studies.

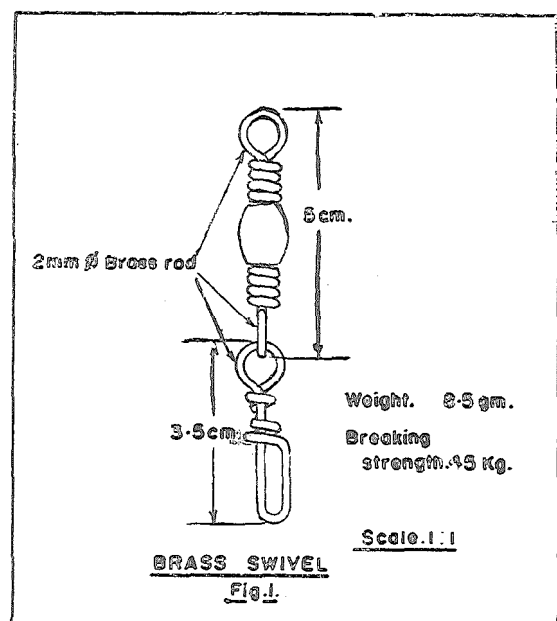
INTRODUCTION.

Simplicity in construction and effectiveness in operation of troll lines with artificial lures (jigs) for the capture of predatory fishes such as seer, tunny, baracuda etc have been emphasised by earlier workers (Deshpande and Sivan, 1969, Subramonia Pillai *et al*, 1971). A careful observation on the behaviour pattern of fish caught in troll lines indicate a certain degree of preferential bites to the different lures (Milne 1955; Sivan and Panikar, 1969). Similarly, jigs with different dimensions and weights are likely to exert an influence on the catches, as on the one hand they would be apparently different in appearance and visibility and on the other there would be differences in the degree of sinking. Since investigations on these and similar aspects have not yet been conducted, studies were initiated with jigs of different physical specifications, thereby bringing about a further improvement in the luring effect of these jigs. The present communication deals with the results obtained on the studies conducted with buffalo horn and

wooden jigs having nine different specifications in each, galvanised iron jigs in six different specifications and fish head jigs in three different specifications.

MATERIALS AND METHODS:

The rigging of the gear and mode of operations were similar to those described by Deshpande *et al* (*op cit*). The brass



swivels used for the rigging of the lines were of uniform specification, the details of which are shown in Fig 1. The design details of 12.5 cm long jigs are as given by Subramonia Pillai *et al* (*op cit*). The details of nine different specifications of buffalo horn and wooden jigs, six different specifications of galvanised iron jigs and three different specifications of fish head jigs are given in Table 1.

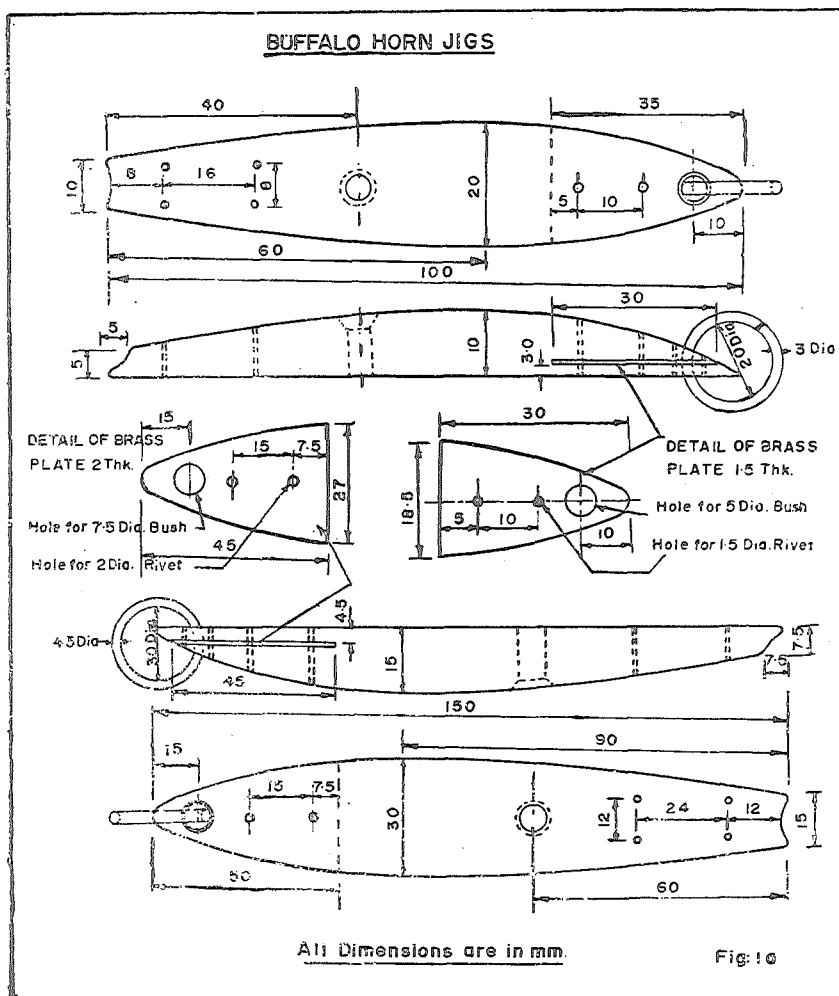
TABLE I SPECIFICATIONS OF JIGS

Jigs	Length: cm.	Weight of the jigs: g
Buffalo horn	10.0	50, 60, 70
	12.5	-do-
	15.0	-do-
Wooden	Same specifications as above	
Galvanised iron	12.5	50, 60, 70
	15.0	-do-
Fish head type	—	-do-

The 10 cm and 15 cm long jigs (Fig 1 A) were fabricated on the basis of the design of 12.5 cm jigs, by adjusting the different dimensions.

For jigs of identical length, differences in weight were brought about by adding lead pieces at their lower surfaces. The galvanised iron jigs and fish head jigs were got fabricated in their specified weights.

Initially a series of twelve valid operations were carried out with nine different specifications of buffalo horn jigs. Subsequently, another series of twenty valid operations were carried out with six different specifications of buffalo horn jigs, eliminating the three specifications of jigs of 10 cm length which were found to be less effective during the initial trial. Wooden jigs were operated in nine specifications



as in the first series of buffalo horn jigs. Seventeen valid operations were carried out with six different specifications of galvanised iron jigs, in the same manner as the second series of buffalo horn jigs. In the case of fish head jigs, a series of nine valid operations were carried out using all the three specifications of weight. The arrangement of the different speci-

cations of jigs for all operations were statistically designed in order to minimise the effect of chance factor.

RESULTS:

The results of the first series of operations with all nine different specifications and second series with six specifications of buffalo horn jigs are given in Table II.

TABLE II CATCHES BY DIFFERENT SPECIFICATIONS OF BUFFALO HORN JIGS

Specifications of jigs		No. of fish caught	Weight: kg.	% of the total catch by number	
Length: cm.	Weight: g			For each jig	Total for each length group of jigs
1st Series	10.0	50	7	6.6	23.7
		60	8	7.6	
		70	10	9.5	
	12.5	50	10	9.5	45.8
		60	26	24.8	
		70	12	11.5	
	15.0	50	8	7.6	30.5
		60	14	13.4	
		70	10	9.5	
2nd Series	12.5	50	10	43.5	7.3
		60	46	191.5	33.8
		70	14	60.0	10.4
	15.0	50	18	68.5	13.2
		60	28	131.5	20.6
		70	20	91.5	14.7

The catch details of the wooden jigs are shown in Table III.

TABLE III CATCH DETAILS OF WOODEN JIGS

Specification of jigs		No. of fish caught	% of the total catch by number	
Length: cm.	Weight: g.		For each jig	For each length group of jigs
10.0	50	2	2.9	22.0
	60	6	8.8	
	70	7	10.3	
12.5	50	3	4.4	42.6
	60	17	25.0	
	70	9	13.2	
15.0	50	6	8.8	35.3
	60	11	16.2	
	70	7	10.3	

Table IV shows catch details of the galvanised iron jigs in six different specifications.

TABLE IV CATCH DETAILS OF GALVANISED IRON JIGS.

Specifications of the jigs		No. of fish caught	Weight of fish: kg.	% of the total catch	
Length: cm.	Weight: g.			For each jig	For each length group of jigs
12.5	50	12	42.25	9.2	
„	60	62	181.00	47.7	68.4
„	70	15	50.00	11.5	
15.0	50	5	14.50	3.9	
„	60	22	67.50	17.0	31.6
„	70	14	35.25	10.7	

Fig II shows the frequency of catch in the different specifications of the fish head jigs.

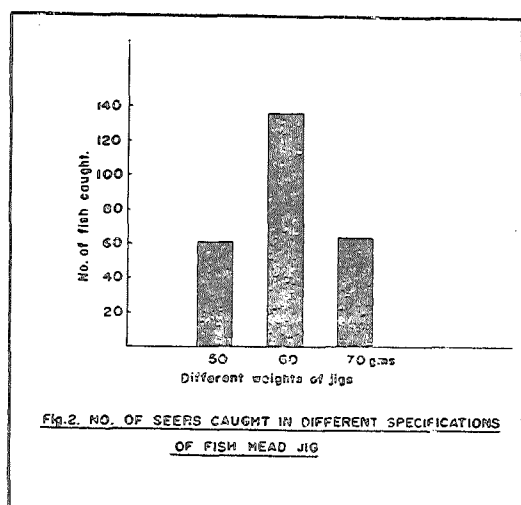


FIG. 2. NO. OF SEERS CAUGHT IN DIFFERENT SPECIFICATIONS OF FISH HEAD JIG

Table V shows the comparison of catch in different specifications of buffalo horn and wooden jigs and buffalo horn and galvanised iron jigs separately.

DISCUSSION:

As evidenced from the results in Table II, buffalo horn jig of 12.5 cm length having 60 g weight was superior to the other specifications of jigs, in catching seer. Of the total catch, the above jig landed 24.8%, whereas the catch for the other specifications of jigs was more or less half or even less. Taking into consideration the jigs of different length groups, irrespective of weights, the jigs of 12.5 cm length landed 45.8% of the total catch (by number). In general, the jigs of 10 cm length were found to be less effective. Table II also clearly reveals the superiority of buffalo horn jigs of 12.5 cm length having 60g weight by landing 33.8% of the total catch by number.

The data were statistically analysed by taking into account the number of fishes caught in different specifications of jigs. The analysis of variance of the data is given in Table VI.

TABLE VI

Source	SS	DF	MS	F
Total	3.7145	71		
Blocks (ignoring treatments)	0.4447	11	0.0404	21
Treatments (eliminating block)	1.0929	8	0.1366	3.27*
Error	2.1769	52	0.0418	

* Significant at 1% level

TABLE V
CATCH INDICES IN PERCENTAGES OF THE TOTAL FOR THE DIFFERENT
SPECIFICATIONS OF BUFFALO HORN, WOODEN AND
GALVANISED IRON JIGS

Specifica- tion of jigs	Length: cm	10.0			12.5			15.0			Total No. of fish caught	No. of days of opera- tions	Catch/ day
		Weight: g	50	60	70	50	60	70	50	60			
Buffalo horn jigs		6.6	7.6	9.5	9.5	24.8	11.5	7.6	13.4	9.5	105	20	5.2, ie; 5
Wooden jigs		2.9	8.8	10.3	4.4	25	13.2	8.8	16.2	10.3	68	13	5.2, ie; 5
*Buffalo horn jigs					7.3	33.8	10.4	13.2	20.6	14.7	136	16	8.5, ie; 8
Galvanised iron jigs					9.2	47.7	11.5	3.9	17.0	10.7	131	15	8.7, ie; 9

* The second series of operation of B. H. jigs.

From the above table, it follows that the treatment combinations are significant at 1% level. An examination of the average of the treatment combination shows that the jigs with 12.5 cm length and 60g weight catch more fish, compared to the other combinations, with the 15cm length and 60g weight jigs coming next in effectiveness.

Analysis of the weights of fish taken by each specification of jigs showed that even quantitatively the jigs with 12.5 cm length and 60g weight catch more than the other combinations at 5% level of significance. Analysis of the data collected during the second cycle of operation (Table II) was done taking into consideration the weight of the fish caught in the six different combinations of the jigs by the analysis of variance technique. (Table VII)

their degree of effectiveness. However, it may be added in this connection that the durability of the wooden jig is much less compared to other types.

Tabl IV shows comparative catching efficiency of different specifications of galvanised iron jigs. It is clear that jigs with 12.5 cm length having 60 g weight are superior in their catching rate to the other specifications of jigs by landing 47.7% of the total catch. The catching rate of the other specifications of jigs are comparatively poor except for the jigs having 15cm length and 60 g weight (17.0%).

The data on the weight of the fish were analysed using the analysis of variance technique after converting them into

TABLE VII

Source	SS	DF	MS	F
Total	7516.58	101		
Between sizes	62.75	1	62.75	3.01
Between weights	1088.64	2	592.52	26.06*
Between operations	3287.58	16	205.47	9.81*
Size x weight	5.94	2	2.97	0.14
Size x operation	600.21	16	37.51	1.80
Weight x operation	1808.71	32	56.52	2.71*
Error	666.35	32	20.82	

* Indicates significance at 1% level.

Significant difference in catch is observed in jigs having 60 g weight compared to others.

Table III shows the details of catch in different specifications of wooden jigs. The 12.5 cm long jigs having weights of 60 g were superior to the other specification of jigs, followed by the jigs having 15 cm length and 60 g weight. In general the catching rate of all jigs of 50 g weight was found to be poor. The jigs of 12.5 cm length groups landed 42.6% of the total catch by number. Thus it may be noted that there was noteworthy difference in

their logarithmic values. The results are given in Table VIII

The critical difference was formed for comparing the average logarithmic catch of fish landed by the jigs of different weights. It could be seen that jigs of 12.5 cm length with 60 g weight were catching more fish by weights compared to jigs of 50 and 70 g. In the case of jigs with 15 cm length no significant difference can be attributed to the catch rate of jigs of 60 and 70g

Table VIII

For jigs with 12.5 cm. length and 50, 60 & 70 g. weights.

Source of variation	SS	DF	MS	F
Total	7.2039	38		
Between weights	2.5630	2	1.2815	9.94*
Error	4.6409	36	0.1289	

* Significant at 1% level

Critical difference : 0.2816

For jigs with 15 cm. length and 50, 60 & 70 g. weights.

Source of variation	SS	DF	MS	F
Total	5.8889	38		
Between weights	1.0237	2	0.5119	3.79*
Error	4.8652	36	0.1351	

*Indicates significance at 5% level

Critical difference : 0.2885

weights. However, significantly lower catch was reported for jigs of 50 g weight.

Fig II clearly reveals the superiority of the fish head jigs having 60 g weight in its catching rate. Out of the total catch, jigs of 60 g weight alone account for 54%.

Analysis of variance technique was used for comparing the catch efficiency of of the jigs of different weights. The analysis of variance of the number of fish

landed by jigs of different weights is given in table IX after converting the figures into their corresponding logarithmic values.

It could be seen from the table that between weights variations were significant at 5% level and jigs with 60 g weight, landed significantly higher number of fish.

The analysis of variance for the weights of fish landed by jigs of different weights is given in table X.

Table IX

Source	SS	DF	MS	F
Total	5.6336	53		
Weights	0.8925	2	0.4462	4.80*
Error	4.7411	51	0.0930	

Critical difference : 0.2030

* Significance at 5% level.

$$\text{Mean logarithmic catch} = \frac{50 \text{ g}}{0.4070} \quad \frac{60 \text{ g}}{0.7107} \quad \frac{70 \text{ g}}{0.4867}$$

Table X

Source	SS	DF	MS	F
Total	8.3999	53		
Weight	2.2120	2	1.1060	9.12*
Error	6.1879	51	0.1213	

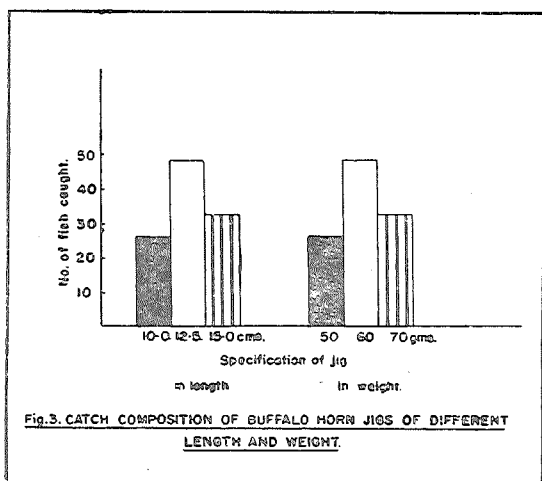
Critical difference : 0.2324

* Significance at 1% level.

Here too between weights, variations are significant at 1% level indicating that the catch rates of jigs of different weights were not similar. The mean logarithmic weights of fish landed by jigs weighing 50 g, 60 g, and 70 g, are 0.5204, 1.0161 and 0.7646 kg respectively. It is quite evident from these figures that jigs weighing 60g weight landed significantly higher catch.

Table V is a comparative statement of the efficiency indices of different specifications of buffalo horn jigs with those of wooden jigs and galvanised iron jigs. A study of the table would reveal that jigs having 12.5 cm length and 60 g weight are superior to jigs of other specifications in their catching efficiency.

Fig.3 shows the catch rate of buffalo horn jigs of different lengths irrespective of weight and jigs of different weights irres-



pective of length. Of the three length specifications, 12.5 cm and of three weight specifications 60 g weight jigs were found superior to those of the other specifications.

SUMMARY

Fishing operations carried out with buffalo horn, wooden and galvanised iron jigs of different physical specifications rigged up in troll lines, revealed that jigs of 12.5 cm length having 60 g weight are superior to those of other specifications in luring seer fish. Fish head jigs when tried in their three specifications of weights, viz, 50, 60 and 70 g, showed that jigs of 60 g have a higher efficiency index than those of 50 and 70 g weights.

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