Exploitation of the non-conventional bullseye fishery resource in Karnataka

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The estimated average all India marine fish landings during 2012-2016 was 36,71,651 t. Of late, the catch of priacanthids has increased in commercial landings all along Indian coast. The bullseye contribution to the total production which was 0.3% in 2011 increased to 3.6% during 2016 and increased by two times from an annual average 23,031 t (2007-2011) to 45,544 t in 2012-2016. Nearly 94% production was from the west coast. During 2007-2016, lowest contribution was by West Bengal (0.4%) and highest by Gujarat (36.1%) and Karnataka (35.8%) followed by Kerala (17%). Bullseye is mainly exploited by trawl nets (95.1%) and the other gears that contributed include gillnet (2.4%), hook & line (0.8%), purse seine (0.39%), ring seine (0.1%), *dol* net (0.06%), non-mechanised (0.04%) and other gears (1.2%). However, since 2015, the purse seines, ring seines and *dol* nets have significantly contributed to the bullseye catch. Karnataka has contributed 11.6% to 52.4% to the all India bullseye catch during 2007-2016 and landings has increased from an annual average 5,017 t during 2007-2011 to 19,564 t during 2012-2016. Gear-wise landings in Karnataka during 2007-2016 indicated that trawl net accounted for 97.1% followed by purse seine (2.5%) and other gears till late 2015. However, during

2016, the purse seines contributed 4.5% to the total bullseye catch in Karnataka. The seven species that contribute to the bullseye fishery of the country include *Priacanthus hamrur*, *P. blochii*, *P. tayenus*, *P. macracanthus*, *P. prolixus*, *Cookeolus japonicus* and *Heteropriacanthus cruentatus* of which the most dominant species is *P. hamrur (*99%) followed by *C. japonicus*.

During 2008-2016, monthly *in-situ* samples were collected from selected multiday trawlers operating along the south west coast of India (11°26.454' N to 17°9.789' N and 72°30.08 E to 75°0.283' E) encompassing the states of Kerala, Karnataka, Goa and Maharashtra. The analysed data revealed that priacanthids had a wide distributional range from 20 to 200 m depth. A slight shift in exploitation grounds from 11°26.454' N to 15°20.446' N and 73°22.242' E to 75° 0.283' E in 2008-09 to 13°34.224' N to 17°9.789' N and 72°30.08' E to 74°19.041' E in 2015-16 was observed (Fig. 1). This was mainly due to the introduction of high speed pelagic trawl nets which enabled operation of these nets even in areas with rocky bottoms (Dineshbabu *et al.*, 2016, *Fishery Technology*, 53: 263-272). Such changes in gears and operational methods, could be one of the reason for the sudden spurt of bullseye landings during 2015-16. Further, highly productive sea mount off Panaji was tapped for bullseye resources. An earlier study had indicated that

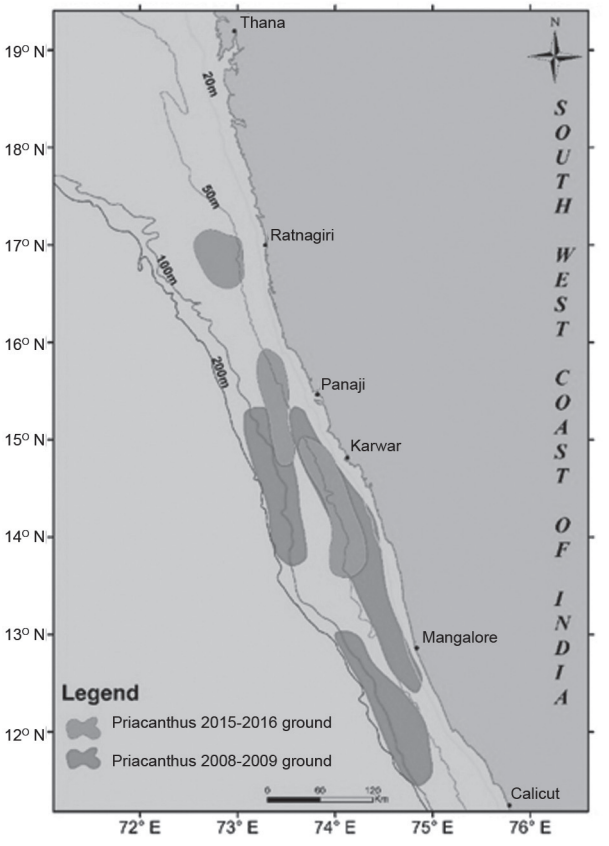

Fig. 1. Locations of operations by multiday trawlers during 2008-2009 and 2015-2016 period

Priacanthus spp. are abundant in the depth zone up to 100 m in area of 11°–12° N and 100 –200 m depth in 13° N (Vijayakumaran and Naik, 1988, *Fish. Surv. India. Spl. Publ., No.* 2: 106 –119; Bande *et*

Table 2. Average gearwise landings of bullseye (in tonnes) in India during 2007-2016

States / Gears	TN	DN	GN	PS	HL	NM	RS	OTHS	Total
West Bengal	129	-	0	-	-	-	-	-	129
Odisha	314	-	0.1	-	-	-	-	-	314
Andhra Pradesh	746	-	9	-	3	6.0	-	0.4	764
Tamil Nadu	611	-	17	-	24	0.02	-	3	655
Puducherry	208	-	25	-	5	0.45	-	4	242
Kerala	5080	42	289	42	133	5.1	4	267	5821
Karnataka	11939	-	1	307	-	-	24	21	12291
Goa	466	-	0	23	-	-	-	-	488
Maharashtra	417	0.1	6	9	-	-	-	-	431
Gujarat	12257	34	92	-	1.2891	-	-	0.01	12384
Daman & Diu	768	-	-	-	-	-	-	-	768
Grand Total	32933	76	439	338	166	11	28	294	34287
% contribution	95.1	0.6	2.4	0.3	0.8	0.04	0.1	1.2	100

TN, Trawl net; DN, *dol* net or bag net; GN, Gillnet; PS, Purse seine; HL, Hook & line; NM, Non-mechanized; RS, Ring seine; OTHS, Other gears

Table 1. Bullseye landings (in tonnes) in India during 2007-2016

States	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average	%
West Bengal	0.5	490	41	225	193	30	50	29	70	160	129	0.4
Odisha	72	46	619	239	126	333	597	361	243	506	314	0.9
Andhra Pradesh	887	529	498	786	443	1282	1418	968	402	422	764	2.2
Tamil Nadu	100	761	796	165	335	385	616	627	1099	1662	655	1.9
Puducherry	0	14	0	7	0	1794	0	30	331	246	242	0.7
Kerala	2893	6956	3727	3096	2692	0	1887	2398	4691	29869	5821	17.0
Karnataka	8166	8349	5520	1688	1364	2652	2487	2782	21347	68554	12291	35.8
Goa	80	2740	274	65	54	1	0	22	1420	228	488	1.4
Maharashtra	729	1144	409	92	13	44	96	176	208	1401	431	1.3
Gujarat	10506	30901	5717	5255	5076	8493	13404	8374	13088	23032	12384	36.1
Daman & Diu	0	0	0	0	275	840	920	308	679	4662	768	2.2
Grand Total (t)	23434	51930	17600	11618	10572	15854	21474	16074	43576	130740	34,287	100
All India catch (t)	2881336	3215242	3163314	3074282	3830262	3948938	3781868	3592853	3404771	3629823	–	–
% contribution	0.8	1.6	0.6	0.4	0.3	0.4	0.6	0.4	1.3	3.6	–	–

al., 1989, *Proc. First Workshop Scient. Result. FORV Sagar Sampada.* p. 233-239) and in the shelf area along Gujarat coast (Bhargava *et al.*, 1995, *Bull. Fish. Surv. India*. 25: 1 –50).

An unprecedented increase in the catches of bullseye in Karnataka could be due to the adoption of high power engines (popularly known as "Chinese engine") and use of lights during fishing. The bullseye were generally caught from the 30 to 200 m depths by trawlers in earlier years. However, in 2015-2016 these fishes were caught within 30 to 70 m depth by various gears (purse seine, ring seine and mid water trawlers). Changes in the consumer preference about bullseye has made it a popular table fish in recent times. As a result the retails unit value (per kg) for medium sized (about 25 cm Total Length) fishes increased from ₹ 8 during 2007 to around ₹ 45 in 2016. The big sized fishes (above 25 cm TL) fetched a price of ₹ 70 per kg in 2016. The characteristic white meat and gel strength texture has made it a preferred raw material in *Surumi* plants. The small sized fishes (10 –20 cm TL) are also in great demand for salting and sun drying while very small sized (<10 cm TL) fish are sold as trash for making poultry feed or used as manure.