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Seine nets for Riverine Fishing in Selected Districts of Kerala

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Result of the study on seine nets operated in the inland waters of three northern districts viz. Kasargod, Kannur and Kozhikode in Kerala state during 2003-2004 is presented. Based on the shape of net and mode of operation mainly three types seines are in use. Chavittu vala is a rectangular seine net operated mostly in Kannur and Kasargod. Seine nets with tapering wings are common in Kozhikode district. Koruvala is a small encircling seine net with provisional bags on both ends. This net is operated in some parts of Kannur and Kasargod by the fishermen migrated from Kollam and Kottayam districts. Rankevala is larger seine with bags operated in Kuttiadi river. The design, fabrication and operational aspects of all types of shore seines in the region are discussed.

Key words : Shore seine, encircling seine, inland fishing, North Kerala

Seine net is a long wall of netting with or without bag, supported by floats and sinkers, which are operated by surrounding an area in the water bodies. A shore seine may be defined as a long length of netting shot from a boat as it is paddled or rowed from the beach in a semicircle having the shore as the chord of its arc, in the endeavor to enclose any fishes that may be in the area within the semi-circular course taken by the boat (Hornell, 1938). Seine nets are operated in sea, rivers, reservoirs, lakes, estuaries and backwaters wherever the bottom is smooth and almost flat. Saxena (1964) described the *mahajal,* traditional seine net in Ganga river system and in Brahmaputra river by Joseph & Narayanan (1965). Seine net operated in Hooghly estuarine system has been described by Mitra *et. al.,* (1987) and in the estuaries of Karnataka by Sathyanarayanappa *et al.,* (1987). Seines nets in different reservoirs have been reported by Jones (1959), Brandt (1972), George, (1983 a & b), Khan, *et. al.,* (1991) and Ninan & Kumar (2003).

Krishnamurthy & Rao (1970) described the operation of seine net in Pulicat lake. Roy & Banerjee (1980) has briefly mentioned the occurrence of *Bhida jal,* a large seine in Chilka lake.

In Kerala, shore seines are mainly seen in the central and north Kerala. The first report on the shore seines of Kerala is by Hornell (1938). Shetty (1965) reported the operation of *pattukannyvala and telikannivala,* seine nets with smaller and larger mesh size respectively in Vembanad lake. Kurup & Samuel (1985) and Kurup *et. al.,* (1993) reported the presence of seines in rivers and Vembanad lake in central

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Kerala. Although these reports mention the occurrence of seines, so far no detailed study has been undertaken on shore seine nets in the inland waters of Kerala.

Materials and Methods

The study on shore seines operated in the inland waters of north Kerala has been undertaken during March 2003 to June 2004. Three districts viz. Kozhikode, Kannur and Kasargod were selected for the study based on the density of inland water bodies as well as the fishermen population (Anon, 2003). Details regarding design, mounting, operation and catch of seine nets were collected from all known seine net fishing centers as per the methodology suggested by Miyamoto (1962). Gear details were collected from all places by checking representative samples. Data collected with the questionnaires were supplemented by interviewing fishermen and net makers and observations made from the fishing sites. Data on the catch particulars has been collected during every week from a unit at Pinarai, Anjarakandy river during 2003-2004.

Results and discussion

Approximately 10 % of the inland fishermen operate seine net in north Kerala. The length and breadth of the seine net show considerable variation and are mainly dependent on the nature of the water body. According to the shape and mode of operation mainly three types of seines are found in different parts of north Kerala.

Koruvala/Valappevala

Koruvala is a common seine found in different parts of north Kerala. The net is rectangular in shape with 40-50 m length and 2.4 to 5 m depth, made of nylon (PA) multifilament of 210Dx1x2 having 10-18 mm mesh size (Fig.1). Prior to fabrication the netting is dipped in black dye to extend the shelf-life as well as to minimise its visibility under water. Polypropylene (PP) rope of about 10 mm dia is used as head rope (HR) and coir rope of 10 to 20 mm dia is used as foot rope (FR). Poly vinyl chloride floats are attached to the HR. FR is with or without lead sinkers. Net without sinker is used in areas were the current is weak and bottom is muddy. Joseph and Narayanan (1965) reported that the absence of sinkers is often compensated by a much thicker foot rope. They also reduce the number of floats in areas where the current is strong to prevent drifting. Selvedge, known as *alle*, is 1-1.5 mesh depth and is usually made of PA 210Dx8x3 with 50-60 mm mesh size. Coir rope is used as FR because it sinks to the bottom in wet condition and also provide better grip while hauling the net. In *koruvala* both ends were made tapering by lacing about 70 % of the meshes in the edges to form bags at both ends. In a net with 500 mesh depth about 350 meshes are laced to make the bags known as *konda*. Major portion of the catch is collected in these bags. Approximate cost of a net of 40 m length is Rs.5000/- and it can be operated for 2-4 years.

The *koruvala* is a small encircling seine net, which is operated by the fishermen, migrated from Kottayam and Kollam and settled in Kannur and Kasargod districts. They are settled in colonies near the water bodies in Kavvayi, in Kasargod district; Payangadi, Mattool, Cherukkune and Chempallykunde in Kannur district. According to Kurup *et al.*, (1993) during pre-monsoon season the fishermen from Kollam district migrate along the entire stretches of backwaters of Kerala. Such fishermen were not allowed to fish in certain water bodies in these districts.

Generally two fishermen operate the net using a wooden canoe of 4-5 m length. In some places two seine nets are joined together before operation. HR and FR usually extends to about one meter, on both sides, beyond the mounted length of the net. A wooden pole of about 2.5-3 m length is attached to these ropes on both ends

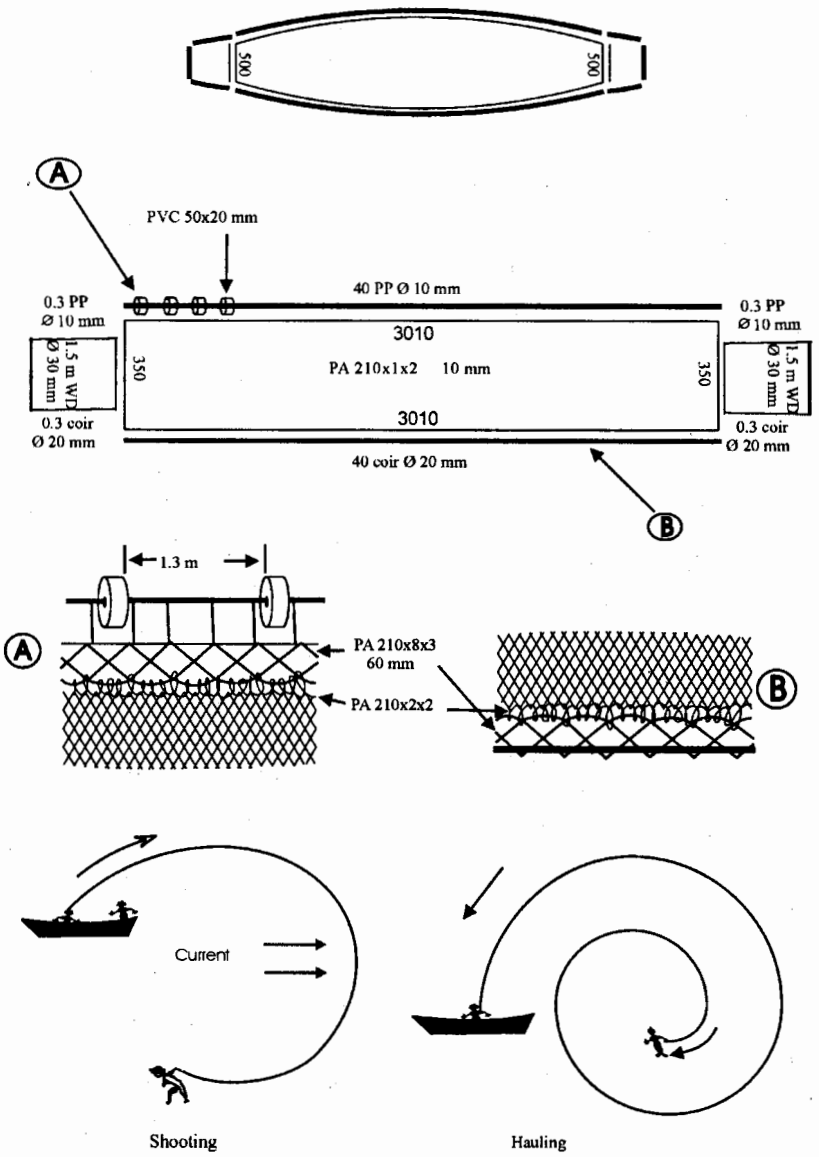

Fig. 1. Design details of a *koruvala* from Kuppam river

at about 30 cm from the net. Net is operated through out the season preferably during night, irrespective of the tide. According to the fishermen catch of *M. monoceros* is always better during night as they may avoid the net in the daylight. Some fishermen starts by evening and come back by midnight. Others go in the mid night and return by early morning depending on the season. Net is operated in known grounds where the depth is 2-3 m. One end of the net is handed over to the fisherman standing in water and the other fisherman releases the net from the canoe in a circular fashion along the direction of water flow to spread the net properly. If the depth is less, then the pole at one end is fixed to the bottom close to the shore and the other end is dragged through water for spreading. Hauling is done by pulling the HR and FR together from one end. Simultaneously the other end of the net is taken inside the circle by the second person and he moves in a circular manner to collect the catch into the pocket in the same side of the net. After hauling and washing the net, catch is removed and the process is repeated in another place. Depending on the catch 8-12 hauls could be made during a trip. Number of fishing days

in a week varies from 4-6 depending on the season.

During the beginning of monsoon, catch mainly comprise Ambassids. November to January income per head varies from Rs. 50-100/- During March to May average income per head reaches up to Rs.500/day. This is mainly because when the salinity increases the landings of white prawn, *Fenneropenaeus indicus* also increases. In the begining of summer *M. monceros* dominate the catch whereas *M. dobsoni* is available through out the season.

Rankevala is a similar type of net operated in the backwaters in Kolaipalam, in Kozhikode. According to the local fishermen, this net is shot in the form of Malayalam alphabet "ra" and hence the name *rankevala*. Main body of the net is made of PA 210Dx1x2 whereas lower part of the net up to 30-40 cm height is made of PA 210Dx1x3 to make it heavier. No sinkers are used and a thicker coir rope is used to compensate. Length of a unit is about 50 m and landing bags are made on either end of the net by joining the meshes in the edge.

Chavittu vala-I

Chavittu vala are rectangular seines operated in the lower reaches of Kuppam and Valapatanam are known as *Chavittu vala*. Similar type of seines operated in Chithari and Chandragiri rivers are known as *rammini* and that of Kadalundi river is known as *Adakkamkolli vala*. The nets in operation at Pattuvam, in Kuppam river is about 160 m in length which includes 7-8 rectangular pieces having 3.5 m hung depth (Fig.2). PA knotless webbing with 7.5 mm mesh size is used for the fabrication. Selvedge at the upper and lower edge of the net is hand made using PA multi filament of 210x 4x 3 or 210x5x3 with 60 mm mesh size. 8-10 mm dia PP rope is used as HR whereas 12-15 mm dia coir rope is preferred as FR because in wet condition it sinks in water. 2-3 mm dia PP twine is used as float line which is attached to the HR. 80-100 g lead sinkers are used at about 1.3 m intervals in the FR. At the time of operation HR and FR on both end of the net are tied to two wooden poles of about 0.8-1 m size, leaving about one meter distance between net and the pole. Coir rope of 25 mm dia and 50 m length is attached to these poles on both ends, which serves as herding and hauling rope. Seine net up to 250 x 13 m, intended for marine fishing is operated in the lower reaches of Chandragiri river.

Net is operated throughout the season except during heavy monsoon. Six to seven fishermen and two canoes take part in an operation. Depth of operation varies from 2-3 m. On reaching the ground, the rope at one end of the net is passed to the second canoe. The canoes move apart to simultaneously, releasing the rope and net in a semi-circular form. After shooting the canoes come back to shore with the rope. Meanwhile one or two fishermen standing out side the circle press the foot rope into the bottom using legs and hence it is *chavittuvala* (*chavittu* = pressing by feet). Hauling is done from both ends by dragging the HR and FR in such a way that the foot rope comes up faster than the head rope. The net reaches the surface in a nearly horizontal position with deep sag in which the fishes are held (Hickling, 1961). Towards end of hauling the catch is collected in the central part of the net. The fishermen lift the net from all sides, wash the to remove mud and empty the catch into the canoe. After cleaning the net they move to another place and the process is repeated. Each operation takes about one hour and 4-6 hauls are made in a day. Prawns like *Metapenaeus dobsoni, M. monoceros, Feneropenaeus indicus* and fishes like Ambassids and other small fishes are the major components of the catch. The total income is shared in such a way that the owner of the craft and gear gets one share extra than the others.

***Chavittu vala*-II**

The nets operated at Pinarai in

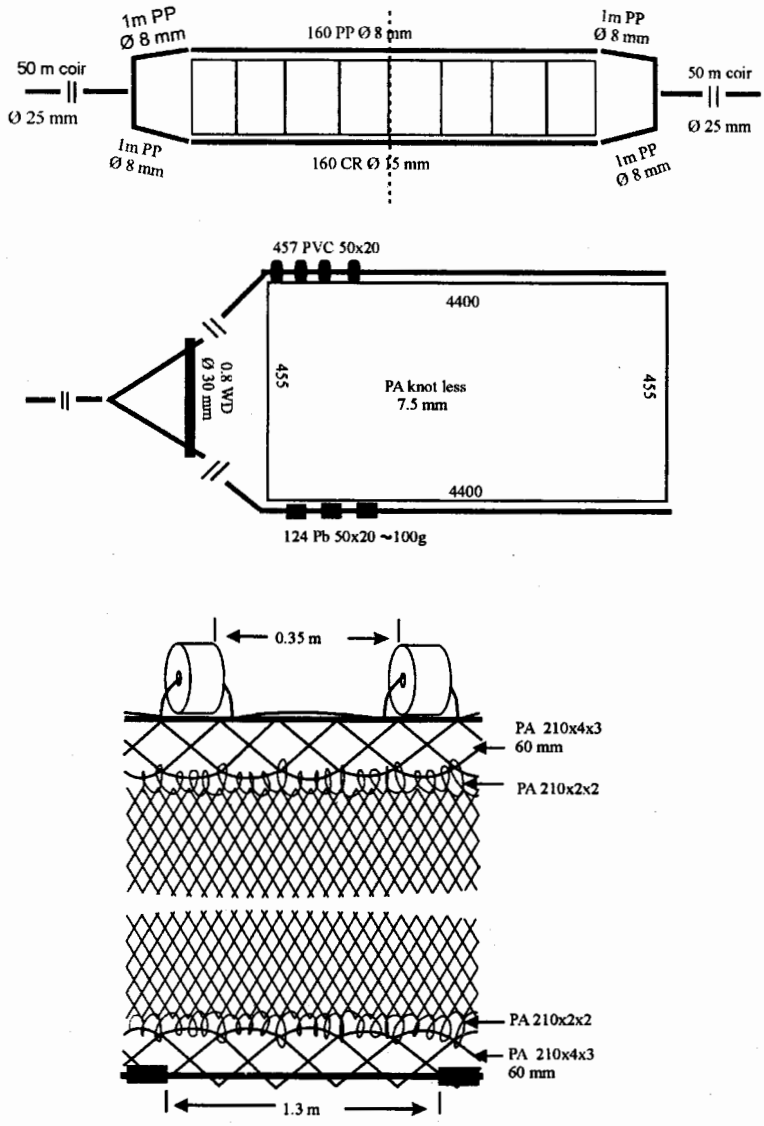

Fig. 2. Design details of a *Chavittuvala-I* from Kuppam river

Anjarakandy river is also known as *chavittu vala* but the main difference is the tapering wings on either side. Saxena (1988) and George (1971) reported that maximum depth of seine net in rivers is always in the middle region, which tapers towards the two arms. Total length of a unit is 90-100 m with nine meter hung depth at the central part. Each unit consists of about eight pieces (Fig.3). Dimension of the middle unit is 14 x 9 m and it reduces to 5.5 x 4.5 m at the wing end. Net is made of PA multifilament 210Dx1x3 or PA knotless netting of 10 mm mesh size. According to the fishermen, multifilament webbing is better for seine net targeting prawns whereas knotless netting is suitable for the net for Ambassids as the fish will not be gilled or enmeshed in the net. Hence depending on the catch they may use suitable netting.

Mode of operation is similar to that of *chavittu vala*-I described above. The ropes on both end of the net are not used when they operate the net close to the shore and in prawn culture farms. All types of fishes and prawns are caught in the net.

A seine net with trapezoidal shape is

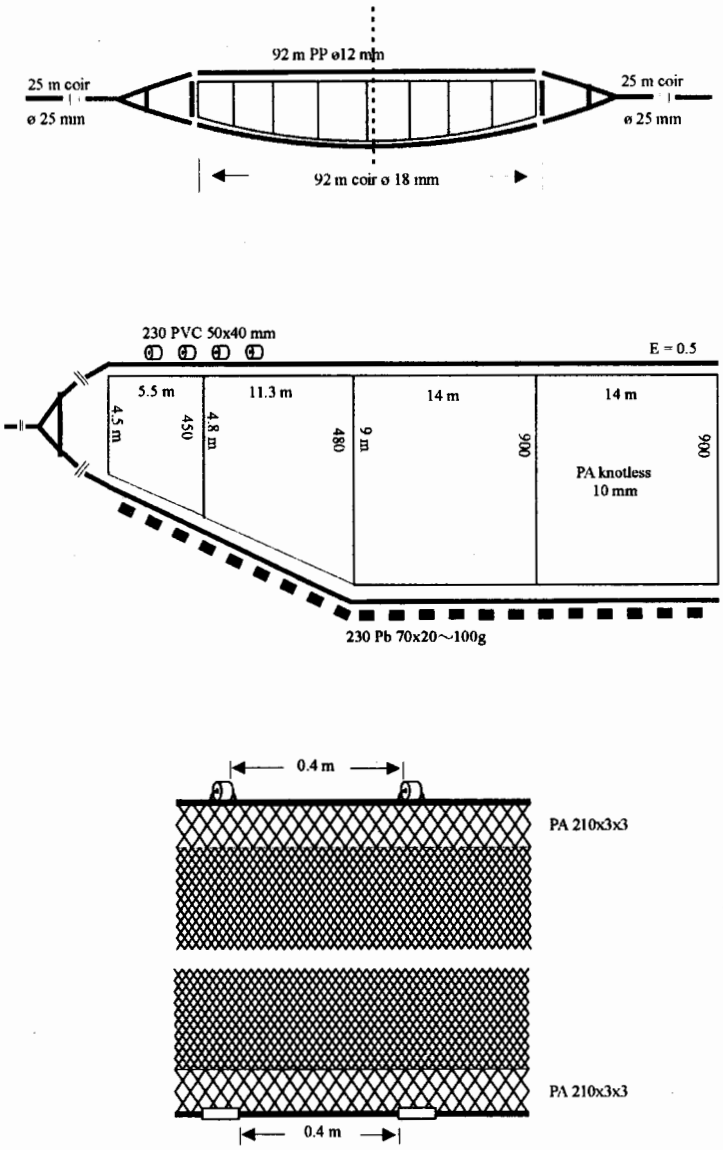

Fig.3. Design details of *Chavittuvalla-II* in Anjarakandy river

found in operation in the middle stretches of Korapuzha in Kozhikode. The net is about 75 m in length with a hung depth of 4 m on one side and 8.5 m on the other side. Operation is almost similar to that of *chavittuvala*. The shorter end is held near the shore and the other end is dragged through the deeper areas. Technical specifications of different types of seine nets operated in north Kerala are presented in Table 1.

Data on catch particulars collected from a seine net unit at Pinarai, during April 2003 to April 2004 was analysed to get a clear idea of the performance. Average catch per day was about 31 kg and CPUE of 7.8 kg/hr. Total income varied from Rs. 1500 to 4000/- per day during the period of study. Returns are better during summer season, when they get prawns. Kurup *et al.*, (1993) reported that ingression of penaeid prawns during summer along the estuarine areas of Kerala. During this period the average income per head varies from Rs. 210 to Rs. 570 per day. During monsoon season they get better price for their catch as the marine fish availability in the market is very low. Performance of *chavittuvala*-II at Pinarai, in Anjarakandy river during 2003-2004 is given as Fig.4

The catch is declining due to proliferation of different types of fishing gears and unscientific utilization aquatic resources.

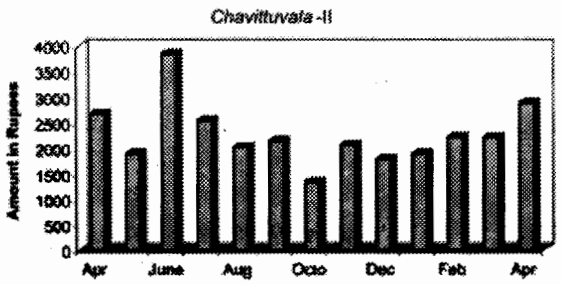

Fig. 4 Average monthly income of *chavittuvala*-II at Pinarai, in Anjarakandy river during 2003-2004

Sugunan & Sinha (2001) reported that rivers, estuaries and backwaters in our country are exploited to the maximum and it is not possible to further increase the production. Adoption of conservation and management measures like is closed areas and closed season is required for sustaining the present level of fish production in these water bodies.

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Table 1 Technical specifications of seine nets in north Kerala

Local name	*Chavittevala*	*Chavittevala-II*	*Koruvala*	*Adakkam- kolli*	*Rankevala*	*Koruvala*
Place/River	All places	Anjarakandy	Kuppam/ Kavvai	Korapuzha	Korapuzha	Korapuzha
Main netting material	PA multi	PA multi/ PA knotless	PA multi	PA multi	PA multi	PA multi
Mesh size (mm)	7.5-30	10	10-18	20	10-16	10-20
Twine size	210Dx1x2, 210Dx1x3	210Dx4x3, 210Dx5x3	210Dx1x2	210Dx2x2	210Dx1x2 & 210DX1x3	210Dx1x2
Length/unit (m)	60-160	90-100	40-55*	75	35-45	75
Mounted depth (m)	6-7	8-9	2.4-5.5	9	7.5-8.25 (1.5-2m after lacing)	4 (2m after lacing) 8.5 on the other end
No.of meshes in depth	100-625	520-900 (middle)	250-600	800	825-850	800-850
Shape	Rectangular	Tapering wings	Rectangular**	Rectangular	Tapering	Trapezoidal
Hanging coeffi. (E)	0.4-0.45	0.50	0.4-0.5	0.55	0.5-0.7	0.5
Head Rope	Coir/PP	PP	PP	PP	PP	PP
Diameter (mm)	8-10	10	15	8	8	8
Foot rope	Coir	Coir	Coir	Coir	Coir	Coir
Diameter (mm)	10-12	10-12	10-15	10	10-12	10
Selvedge	PAmulti	PAmulti	PA multi	PA multi	PA multi	PA multi
Mesh size (mm)	30	30 & 40(2nd)	50-60	35	40	30
Twine size	210Dx2x3, 210Dx3x3	210Dx3x3	210Dx8x3	210Dx16x3	210Dx12x3& 210Dx12x4	210Dx12/3
Floats	PVC/Wood	PVC	PVC	PVC	PVC	PVC
Size (mm)	50x20/50x40	50x40, 50x50	50x15/50x20	40-50x20	60x20	50x20
Shape	Spherical/ Cylndrical	Cylindrical	Disc	Disc	Disc	Disc
Floats/unit (Nos.)	200-450	240-250	55-75	185-200	64-125	180-190
Sinkers	Lead	Lead	Lead***	Lead	Nil	Clay
Size (mm)	50-70x20	70x20	NA	60	NA	40
Shape	Rectangular/ Cylindrical	Rectangular	NA	Rectangular	NA	Oval
Weight (g)	50-100	80-100	NA	30-40	NA	150
Sinkers/unit (Nos.)	125-205	230-240	NA	75-80	NA	80
Approximate cost (Rs)	30,000/-	30,000/-	5000/-	25,000/-	18,000/-	20,000/-
Target species	Prawn, mullet, Ambassids	Prawn, Mullet, Ambassids, etc	Small fishes & prawns	Fishes & prawns	Mostly prawn	All

*Two units are laced together before operation ** Bag is made by lacing together half of the meshes in both edges ***Sinkers are very few or totally absent in places where current is mild

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