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POSTSMOLTS OF RANCHED ATLANTIC SALMON (*Salmo salar* L.) IN ICELAND: II. The first days of the sea migration

by

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Abstract

Atlantic salmon (*Salmo salar* L.) postsmolts of hatchery origin were sampled during their migration in coastal waters in the bay of Breidafjord, West Iceland in 1993 and 1994. The postsmolts were released from net pens in a infjord, by a ranching station. Fishing was done in areas that were 4 - 75 km from the releasing site in several periods from June to September, mostly coinciding with releases of smolts. The fishing gear used were floating gillnets (3 and 6 m deep) and a floating twin boat pelagic trawl. The postsmolts (13-36 cm) started their migration towards open ocean right after release. The maximum migration speed was 2.4 km/hour and the mean swimming speed was 1.6 km/hour. Most of the postmolts occurred scattered in the uppermost 3 meters of the nets, but indications of small schools were found. The postsmolts were swimming at greater depths during daylight than during the dark hours when they were caught close to surface (0,05-0,5 m). Approximately 4 km from the release site, where Kolgrafafjord opens into the bay of Breidafjord, postsmolts were scattered from shore to shore. In the outer areas the majority of the postsmolts migrated away from the shore over the open waters of Breidafjord bay. Repeated tracking of released smolts with drift nets suggested that the majority of the postsmolts had migrated out of the bay and into the open ocean within 2-3 days. A minority of the released postsmolts migrated along the shore of the bay, mostly towards the inner area of the bay. These postsmolts were atypical as indicated by very high ratio of maturing males.

Key words: Atlantic salmon, postsmolts, migration, maturing males, ranching

Introduction

The ecology of Atlantic salmon postsmolts is of special interest due to indications of high mortalities during early sea life, either by predation on postsmolts (Larson 1984; Valle 1985; Hvidsten & Møkkelgjerd 1987; Hvidsten & Lund 1988; Montevecchi et al 1988) and/or due to adverse sea condition at the beginning of the feeding migration (Scarnecchia 1984). When considering the questions whether, when and how these circumstances influence the Atlantic salmon postsmolts in a given area it is clear that the distribution of postsmolts in the area has to be known and therefore studies on their migration are the first steps towards further knowlegde.

In later years the large scale sea ranching with Atlantic salmon (*Salmo salar* L.) in Iceland have given basis for researches on the salmon postsmolts ecology. Firstly millions of salmon postsmolts released from single release site at different dates gives opportunity to capture postsmolts quite far from release site in sufficient numbers with traditional fishing methods without considerable fishing effort and additionally to observe the migration behaviour under different environmental circumstances. Secondly new questions rose when the large scale releasings started, regarding whether large scale releases were affecting the survival of the postsmolts and other fishes in the area. This paper is one of a series of papers derived from research on the ecology of postsmolt salmon in Breidafjord bay W-Iceland. This sampling was a continuation of earlier research done in the infjord area (Hraunsfjord and Kolgrafafjord) in 1989 and 1990 (Sturlaugsson 1994). The aim of this part of the project was to study the the first part of the sea migration of Atlantic salmon postsmolts. The specific questions are: (1) what are the routes of the oceanward migrating salmon postsmolts, moving trough the bay? (2) What are the average migration speeds ? (3) Are delayed releases affecting the outward migration of postsmolts ? (4) Are the changes in environmental parameters affecting the routes, rates of the postsmolts run and the vertical distribution within them ? (5) Are the released maturing male postsmolts, migrating to some extent out from the infjord where they are released ?

The definitions of postsmolt and other life-history phases of Atlantic salmon used here are according to Allan and Ritter (1977). Therefore the fish are here named postsmolts after being reared in salt water in net pens in Hraunsfjordur, although the actual postsmolt phase of these fish starts when they are released and start their seaward migration.

Material and methods

Study area

Experimental fishing was carried out in the Breidafjord bay, W- Iceland in 1993 (June-September) and in June-July in1994 (Fig. 1). Environmental conditions have been described elsewere (see paper I in this series, Thorisson &Sturlaugsson 1995).

Releases

The rearing process in Hraunsfjord ranching station, in 1993 and 1994, started when parrs were transported to net cages in a freshwater lake at the head of Hraunsfjord (Fig. 1). There they were reared for 2-12 months prior to release, but early in the summer after the majority of fish in each net cage had shown smolt characteristics, the fish were transported from the lake into net pens in Hraunsfjord. The smolts were reared in these cages, to adapt them to salt water and for maintenance of smoltification. After ½-2 ½ months in these cages the smolts were transported out into Kolgrafafjord by towing the net pens. The smolts were subsequently reared for 2-3 days prior to release, wich always took place in the beginning of ebb tide, either during full daylight conditions or during dusk/dark.

A total of about 1.8 million postsmolts were released in Kolgrafarfjord 1993, in series of 8 releases from 21st of June to 26th of August (Table 1). In 1994 the number of released postsmolts were approximately 2.3 millions. The released postsmolts were dominated by one years old smolts (1+), although the first releases of each year had high proportion of two years old smolts (2+). The 2+ postsmolts released were in two size groups. The smaller ones consisted of former 1+ lower mode fish and the largest were former 1+ upper mode fish that had been held back until desmoltification and resmoltified as 2+.

Sampling and laboratory methods

The fishing was done both during day and night during June - September 1993, and in June -July in 1994 at station 1.1, 2.1, 3.1 at July 9, August 7-9 & 24-26, both before, during and after releases salmon postsmolts (Fig. 1 & Table 1). The fishing in 1993 was done from a 6 metre PVC-dinghy, with a 2 man crew, but in 1994 we used a 7 metre fiber glass boat, with a crew of 3. In 1993 the effort was directed towards the area were Kolgrafafjord opens into Breidafjord about 4 km from the releasing site and outer areas of Breidafjord, up to 30 km from the releasing site both at shore and offshore. In 1994 fishing was done in offshore areas further out from the releasing site (40-75 km). In addition some fishing was done at the mouth of Kolgrafafjord as control to the fishing carried out there in 1993. In the present paper the data from 1994 will exclusively be used for comparison on the distribution and speed of the migrating postsmolts.

Samples of smolts were obtained by using floating monofilament gill nets, that were combined of 6 panels of different mesh sizes. The nets were 3 m and 6 m deep. The 3 m deep nets were 90 m long (bar mesh size respectively: 12,22,16,26,14 & 18 mm), and the 6 m deep nets were 120 m long (bar mesh size respectively: 15,26,18,22.5,16 & 35 mm). The nets were both used single and in series up to 1140 m long, laid perpendicular to the shore or drifting over depths (Fig. 1.). The shore located nets farther from releasing site than 10 km, the nets were laid at low tide in shallow waters mostly over intertidal areas and where therefore fishing at high tide. In

1993 there were a total of 101 visitation of nets. The mean interval between visitation of net series that captured postsmolts were 6.4 hours (SD=4.9) in 1993.

Tracking of postsmolts was done by drift net series fishing 10th of August 1993 (stations 2.1, 2.2 & 2.3 see Fig 1 & Table 1) and in June 1994 (stations 2.1, 3.1 & 2.4). Then we started by capturing the first outward migrating postsmolts at station 2.1 and subsequently we sailed further out and laid another series of nets and waited again for capture from the front of the outward migrating postsmolts and then this fishing process were repeated farther out. During these trackings, sea bird quickly discovered if postsmolts were caught in the nets and were therefore good indicators of the timing of the fastest migrating postsmolts.

Floating twin-boat pelagic trawl was used to fish for postsmolts (21-23 July) from two releases (21 and 22 of July). The trawl was 56 m long, with vertical opening of 4 m (for details see Holst and Hvidsten 1992) and was towed with the speed of one mile per hour for 10-60 minutes. A total of 25 tows were completed. The position of trawling routes are shown in Fig.1.

Migration speed of postsmolts were based on the first definite pulse of fish in the gear after release and the first postsmolt captures from that peak observed by visitation of nets while they were fishing (stations 2.1-2.4, 3.1,1.1. and 1.3, see Fig.1 & Table 1). Additionally data derived from microtagged postsmolts were used. Estimation of migration speed were additionally based on visual positioning on leaping postsmolts when light and weather condition were suitable. In addition information about the migrating speed were one night in August gained by audible means. Then the boat was tied to the drift net serie troughout the dark hours and due to still weather we could hear the first splashes made by postsmolts entering the nets series at the surface, we noted time and position (ground posititoning sytem) and subsequently checked the capture.

Captured salmon postsmolts from each visitation of nets were kept separately with information (e.g. vertical placement of fishes). The bags were kept in gas freezer in the boat while sailing to Hraunsfjord, were the freezing of the postsmolts was continued in deep freezer with maximum of 5 postsmolts per plastic bag.

There were two exceptions from freezing the postsmolts on board. Then the captured postsmolts were taken on board entangled in the nets to enable measurements of their placement in the nets at shore. The net visitations choosen had good capture during short periods in the beginning of the outward postsmolt run about 4 km away from releasing site, both offshore on 26th of August 1993 (hours 16-17) and at shore on June 8th 1994. Then the nets with the captured fish were iced into tubs on board while sailing to Hraunsfjord. The postsmolts placement in nets were then measured in cm, both horizontal and vertical after the nets had been pulled taut at the dock, and afterwards the postsmolts were put in freezer. In addition to these placement measurements of postsmolts, the size of each postsmolt was measured and recorded in relation to the placement in the net in 1994. At the laboratory the postsmolts were weighed to the nearest 0.1 g on an electronic balance, forklength was measured to the nearest millimeter and microtags taken from tagged fish. The coloration as criteria of smolting was estimated according to modification of the procedures of Johnstone and Eales (1967) and Birt and Green (1986). The state of maturity was estimated according to Dahl (1917).

The units used for computing the catch per unit effort (CPUE) were postsmolts/1 km of net/hour for net fishing and postsmolts/hour for trawl fishing.

The average swimming speed were estimated by using migration speed and accounting for an estimated mean tidal current (0.7 km/hour).

Results and discussion

Catch

During the experimental fishing in 1993, a total of 663 Atlantic salmon postsmolts (26.8-565.0g) were caught, mostly by nets, but 131 were caught by trawl (Fig. 2). The number of microtagged postsmolts caught were 65 (9.8% of the catch). The highest CPUE was at the mouth of Kolgrafafjord, 2133 postsmolts/ km/hour and 732 postsmolts/hour in 1993 and 2700 postsmolts/ km/hour in 1994, but in outer areas it was lower (Table 1).

Fishing before the releases in August (9th & 26th), 15-17 days after last release gave only postsmolt capture in 3 out of 14 visitations of nets. In those instances no capture occured at station 1.1 and the CPUE was very low at stations 2.1 and 3.1, 4.7 and 0.7-1.7 postsmolts/ km/hour respectively. This low CPUE is comparable to the CPUE at stations 2.1 and 3.1 just one day after release. Following the first 4 releases the captures after one to few days after release were relatively higher from the inward part (station 1.1) of the postsmolt run than at stations 2.1 and 3.1 . The highest CPUE at station 1.1 in that time interval was 66.7postsmolts/ km/hour, 36 hours after release. Fishing in September gave no capture of salmon postsmolts (Table 1).

Because of the large number released, followed by a rapid outward migration, the postsmolts were observed in large numbers far from the release site. Good example of this is a capture of 430 postsmolts, approximately 40 km away from the releasing site (station 2.4) in a 1020 meters long series of drift nets, in just 1 hour. Fishing were done three times in the mouth of Breidafjord (70 -75 km away from releasing site) where it opens into open ocean. Due to unfavorable weather the fishing could not take place at the right time in relation to the time of releases and estimated migration speed. In all instances only one postsmolt were caught.

In the research fisheries more males were captured than females (Fig. 2). This skewed sex ratio was due to aggregation of maturing males into the shore area inwards into Breidafjord, but 92% of the total catch of maturing males were captured there (stations 1.1-1.7 see Fig. 1). Among the the non-maturing males a small number were previously mature. These males were typical postsmolts caught along with other postsmolts migrating towards open ocean, with farthest seaward capture at station 2.4. The postsmolts caught had smolt dress, but some of the largest (>25 cm) had not as bright silvery apperance as the others.

Migration

The salmon ranching in Hraunsfjord is based on releases from net pens in the sea. As a result smolting status of the smolts and the resulting migration are not at an optimum level for all the fish when released. Each release group consists therefore of normal outward migrating postsmolts that are a large majority of the releases and atypical postsmolts such as maturing males that are migrating in inshore waters adjacent to nearest freshwater (Sturlaugsson 1994) or as observed here migrating along the shores of Breidafjord bay. Migration of the postsmolts are discussed in relation to feeding in paper III in this series (Sturlaugsson & Thorisson 1995).

Horizontal and vertical position in the nets

Registration of salmon postsmolts placement in the nets from visitation of nets showed both in 1993 and 1994 that they were often caught along the nets,although not random, both offshore (stations 2.1-2.4) and in shore located nets (Fig. 3 & 4). In instances when two 90 m nets were used in serise at the shore and gave capture (station 3.1 - n=3, station 1.1 - n=7, station 1.3 - n=1), then no postsmolts were caught in the outer net. Horizontal distribution within nets was not random and cases were observed that could not been explained with net selection alone. In instances of stationary nets at shore a difference in abundance of migrating postsmolts in relation to distance to shore was observed. Such an example can be seen in Fig. 3, where capture in the 14 mm panel are much better than in the adjacent 16 mm panel, although the size of captured fish in the 14 mm panel (mean length=18.4 cm, max L=23.8 & min L=15.5) indicates that it should rather be caught in the 16 mm panel according to net selection (e.g. Jensen 1990). Comparing the catch data between stations 1.1, 2.1 and 3.1 together with the horizontal distribution along nets at that sites, shows that although the postsmolts in the beginning of the run were dispersed in mouth of Kolgrafafjord shores to shore, they were not evenly distributed troughout the area.

Vertical distribution was also not random, showing selection towards depth intervals. Large majority of the postsmolts caught in Breidafjord in 1993 and 1994 occured scattered in the uppermost 3 m at daylight (Fig. 3 & 4). Mean depth of 1+ postsmolts (N=77) at station 2.1 during daylight (August 26) were 1.8 m (SD=0.8) and maximum and minimum depths were respectively 2.9 m and 0.2 m. Mean depth of 2+ postsmolts (N=115) at station 3.1 during daylight were 1.41 m (SD=0.57) and maximum and minimum depths were respectively 2.85 m and 0.40 m.

During dark hours the postsmolts altered their behaviour and condensed close to the surface. This was observed while fishing with drift nets at night (01:30-3:00) at the mouth of Kolgrafafjord (station 2.1) the 10th of August 1993. See paper I in this series (Thorisson & Sturlaugsson 1995) for details of light intensity. Then the broad front of outward migrating postsmolts were entangled as pearls on a string in the nets at subsurface depths 0.05-0.5m mostly at the depth interval 0.2-0.3 m and the horizontal distance between postsmolts ranged from 0.1-2.0 m.

When 6 m deep nets were used and gave capture of postsmolts (stations 2.1-2.4, n=5 in daylight & n=1 in dark), it was just once that we captured postsmolts beneath the depth of 3 m. In that instance (station 2.4, sunlight) we caught 45 postsmolts at depth interval 0.3-4 m and thereof 5 postsmolts (9%) that were beneath 3 m at depth interval 3.5- 4 m, and the length interval of these postsmolts were comparable to what was observed among postsmolts at lesser depths.

Although the postsmolts were scattered troughout the nets, patches of postsmolts were observed both at shore and offshore, but such postsmolts clusterings have also been observed in net fishing in the NW-Atlantic (Dutil & Coutu 1988). Observed clusters consisted of 3- 15 postsmolts in 1-2 m² areas of the nets, but the highest density observed was 12 postsmolts in 1,5 m² of net. These patches of smolts indicate small schools of postsmolts and/or shows the front of bigger schools that turned back when encountering the nets. A good example of this shoaling behaviour is a capture at station 2.3 (see Fig. 1) when 14 out of 20 postsmolts captured were caught in a 3 m² part of a net series of 2040 m² (600 m long).

Migration towards the ocean

The catches in the repeated fishing showed that the majority of the postsmolts started their seaward migration right after release, and migrated out of Kolgrafafjord in few hours. Then they migrated out over the open waters of Breidafjord bay towards open ocean. Among these postsmolts were previously mature males. Microtagging experiments on previously mature males released in Kolgrafafjord showed that their survival was higher during sea migration compared to their sibling postsmolts that had not matured as parrs (Sturlaugsson et al 1993), contrasting data from the Baltic sea (Leyzerovich & Melnikova 1979; Berglund et al 1992).

After the peak of the postsmolt run from each release there was a rapid decrease in the catch, resulting in very low catches after only few hours. Repeated tracking of released postsmolts with drift nets throughout the bay and the many negative trawling sites, suggested patchy distribution of postsmolts when migrating through the bay and that majority of outward migrating postsmolts had migrated out of the bay (shortest seaway about 80 km) and into the open ocean within 2-3 days.

Inward migration in the bay

A minority of the released postsmolts migrated along the shores of the bay. These postsmolts migrated mostly towards the inner area of the bay. They were therefore not migrating with the outgoing tide as the typical postsmolts, but instead migrated along eastward shores of Kolgrafafjord and then along the shore inwards into Breidafjord, but the main circular current direction in the bay is inward at this side of the bay. These postsmolts were largely atypical as indicated by very high ratio of maturing males that aggregated along the shore, mostly in June and early July when they were in highest abundance in the releases. Capture rates and tagging data at stations 1.1 and 1.3 indicated that following the first releases these males were either migrating for long periods from Kolgrafafjord inwards along the shores of Breidafjord or they aggregated in these areas for some days, sometimes up to a month. Fishing at the shore farther inward gave no capture except maturing males, 30 km away from the releasing site (station 1.7).

Most of the maturing males were the largest 2+ individuals. The maturation of the gonads (stage 3 -5) of these males indicated that they were preparing for spawning the coming autumn. Although the smolt status of these males may be critical because of their maturation stage they were shown feeding successfully in the sea a month after release (tagged fish). This together with their migration into the freshwater in Hraunsfjord troughout the summer (Sturlaugsson 1994) and into rivers (70 and 220 km away) in the autumn, shows that their sea phase are in some aspects comparable to the sea phase of jacks of coho salmon (*Onchorhyncus kisutch*) (e.g. Gross 1985).

Migration speed and swimming speed

The migration speed among postsmolts that were migrating towards open ocean were at average 1.6-1.7 km/hour as shown by capture of postsmolts respectively after 18 hours and 24 hours after release, at a distance of 29 km (station 2.3) and 40 km (station 2.4) away from the release site respectively. The maximum migration speed was observed on outgoing tide following release. The observed maximum migration speed of postsmolts when entering the mouth of Kolgrafafjordur (stations 2.1 & 3.1) and station 2.2, was about 2.4 km/hour during migration in both daylight and also during migration in dark. If observed migration speed are prolonged within a day, for 12 hours (2x6 hours) of ebb tide, then they have travelled 29 km at ebb tide and therefore they must have swimmed actively against the flood tide to reach the 40 km away from release site as observed when the later flood tide within that day ended. Swimming speed were at average 1.3 - 1.9 km/hour, wich in order of magnitude is euqual to 1.4-3.5 body lengths/sec (15-25 cm long postsmolts).

In one series of shore fishing at the mouth of Kolgrafafjord (station 3.1) the intervals between visitation of nets enabled comparison of the size of postsmolts that were leading the postsmolt run and the size of following migrants. Size difference were observed, indicating that the leading postsmolts were bigger (longer) than the postsmolts that followed.

Postsmolts migrating along shores inward Breidafjord bay were migrating much slower, at average at 0.3 km/hour (stations 1.1 & 1.3).

Concluding remarks

Atlantic salmon postsmolts that are released after considerable adaption in net pens in sea, clearly starts their outward migration immediately if they are typical smolts (also observed in earlier studies, Sturlaugsson 1994) and migrate rapidly towards feeding areas in the open ocean as Reddin (1988) suggested. This is reflected here by active migration offshore when entering the bay and swimming both against flood tide as observed by (LaBar et al. (1978) and along with ebb tid. The routes and rates in the postsmolt run were the same for the first few kilometers when comparing catches following different releasing dates troughout the summer 1993 and the catch in 1994. This similarity between releases was observed despite difference in the postsmolts vertical distribution in relation to light intensity and observed difference in environmental parameters in that area, such as visibility, temperature and food abundance (Thorisson & Sturlaugsson 1995). The available data from outer regions of the Breidafjord bay both 1993 and 1994 reveals also this similarity of the postsmolts runs. This indicates that the rapid offshore migration towards open ocean takes priority to feeding at the beginning of the migration towards open ocean.

Knowlegde of the migration of the salmon postsmolts migration in open waters are scarce, but available information shows that Atlantic salmon postsmolts are largely influenced by environmental stimuli when migrating, especially sea currents (LaBar et al. 1978; ; Holm et al. 1984; Døving et al. 1985; Hvidsten et al. 1992). Additionally it has been suggested that their migration routes can alter in relation to abundance of prey of size preferred (Salminen et al 1994). The salmon postsmolts preference for migrating near surface has often been observed and instances have been reported of occasional dives beneath the depths observed here (LaBar et al. 1978; Holm et al. 1982). Homing adult salmon have also been observed to dive occasionally even to considerable depths in Breidafjord bay on their way to Hraunsfjord (Sturlaugsson 1995a). The surface migrations observed here among postsmolts migrating during dark hours on ebb tide are suggested as an behaviour to maximize the migration speed (optimum selective tidal stream transport) in circumstances when predation risk e.g. by avian predators in that area are low.

In addition to the typical sea migration observed in this study, there were atypical sea migration along shores into the bay, due to releases of atypical postsmolts as shown by maturing males that were dominating among these migrants.

The migrating behaviour of the Atlantic salmon postsmolt stage has only partly been explained with respect to the first steps in their migration towards the open Atlantic. In the near future more accurate information about this phase of postsmolts migration will probably be gained by use of more accurate tracking systems (ultrasonic tags), but their design is rapidly improving. In addition there is a reasonible possibility that postsmolt migration in the open ocean may partly be mapped by use of data storage tags within few years (Sturlaugsson 1995b).

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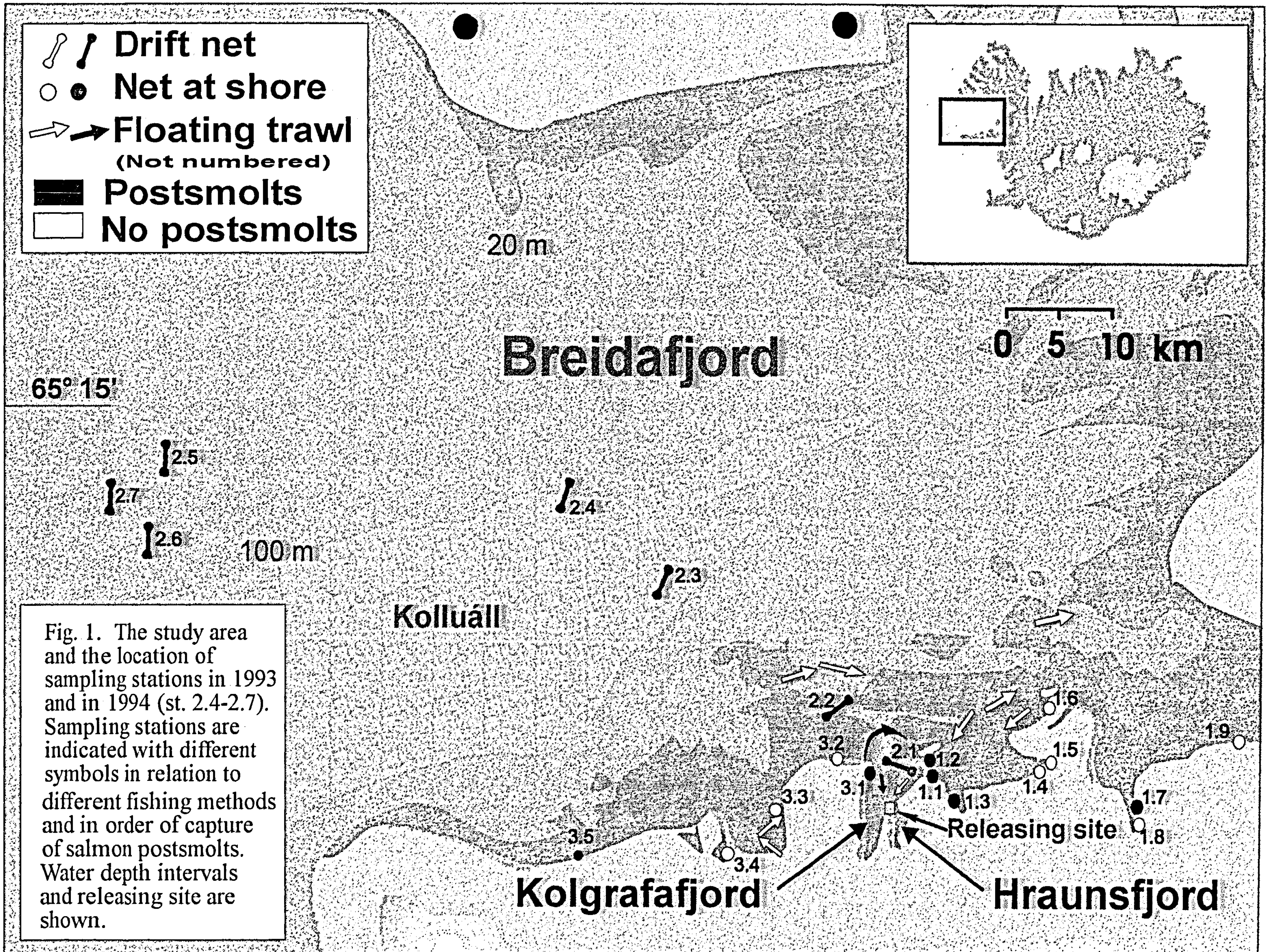

Fig. 1. The study area and the location of sampling stations in 1993 and in 1994 (st. 2.4-2.7). Sampling stations are indicated with different symbols in relation to different fishing methods and in order of capture of salmon postsmolts. Water depth intervals and releasing site are shown.

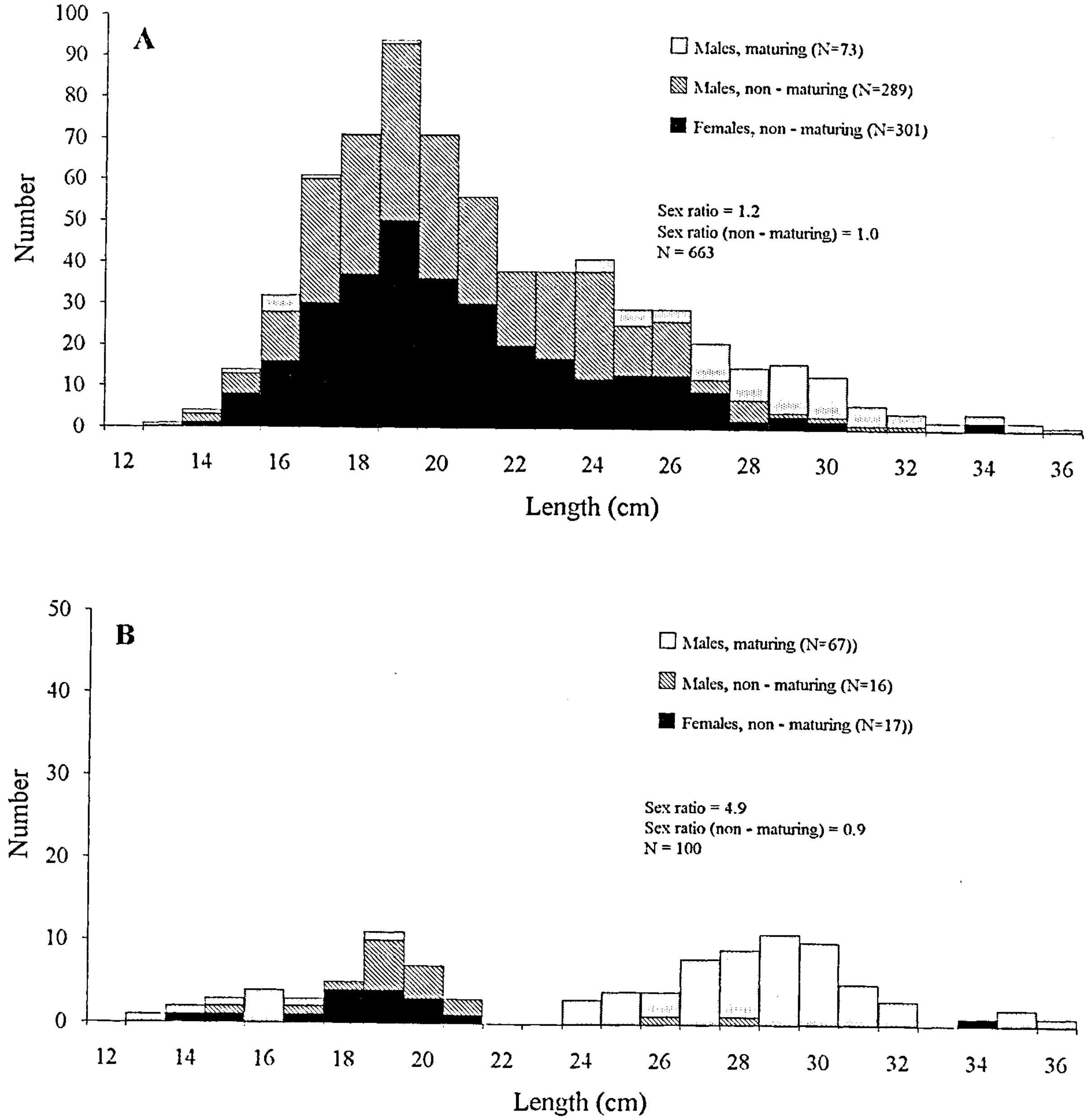

Fig. 2. Length distribution of all salmon postsmolts captured (A) in the bay of Breidafjord (June-August 1993) and thereof inward migrating postsmolts (B), in relation to their sex and maturation. Number of individuals (N) are given for each group and as total, along with sex ratio.

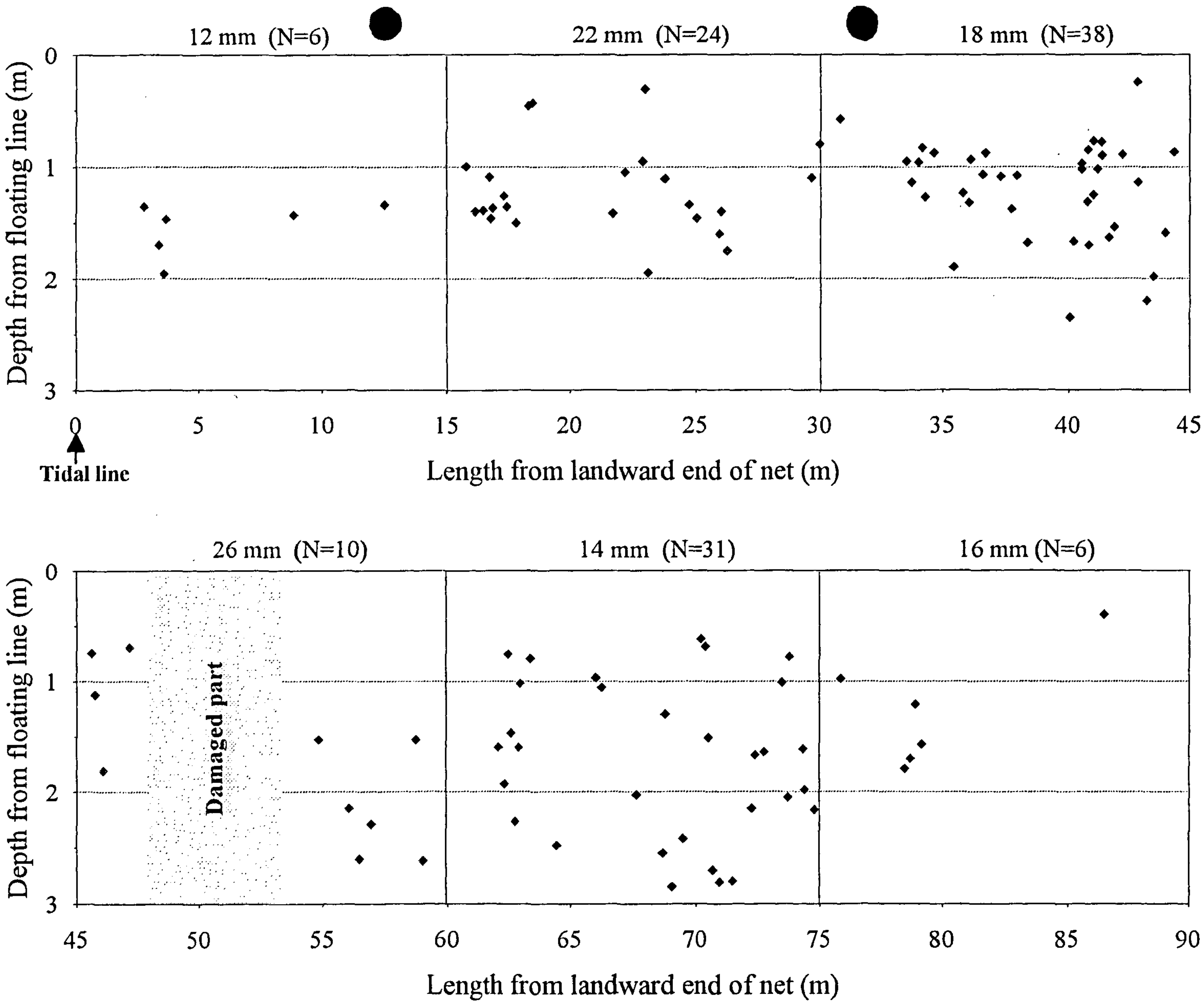

Fig. 3. Distribution of salmon postsmolts (N=115) in floating net in the mouth of Kolgrafafjord 8th of June 1994, about 4 km from release site. The floating net is combined of six 15 m long different panels (mesh sizes 12-26 mm bars), totally 90 m long. The depth and length of the nets are not shown in the same scale. The period of capture is 44 minutes (21:50-22:34), about 3 hours after release of the postsmolts.

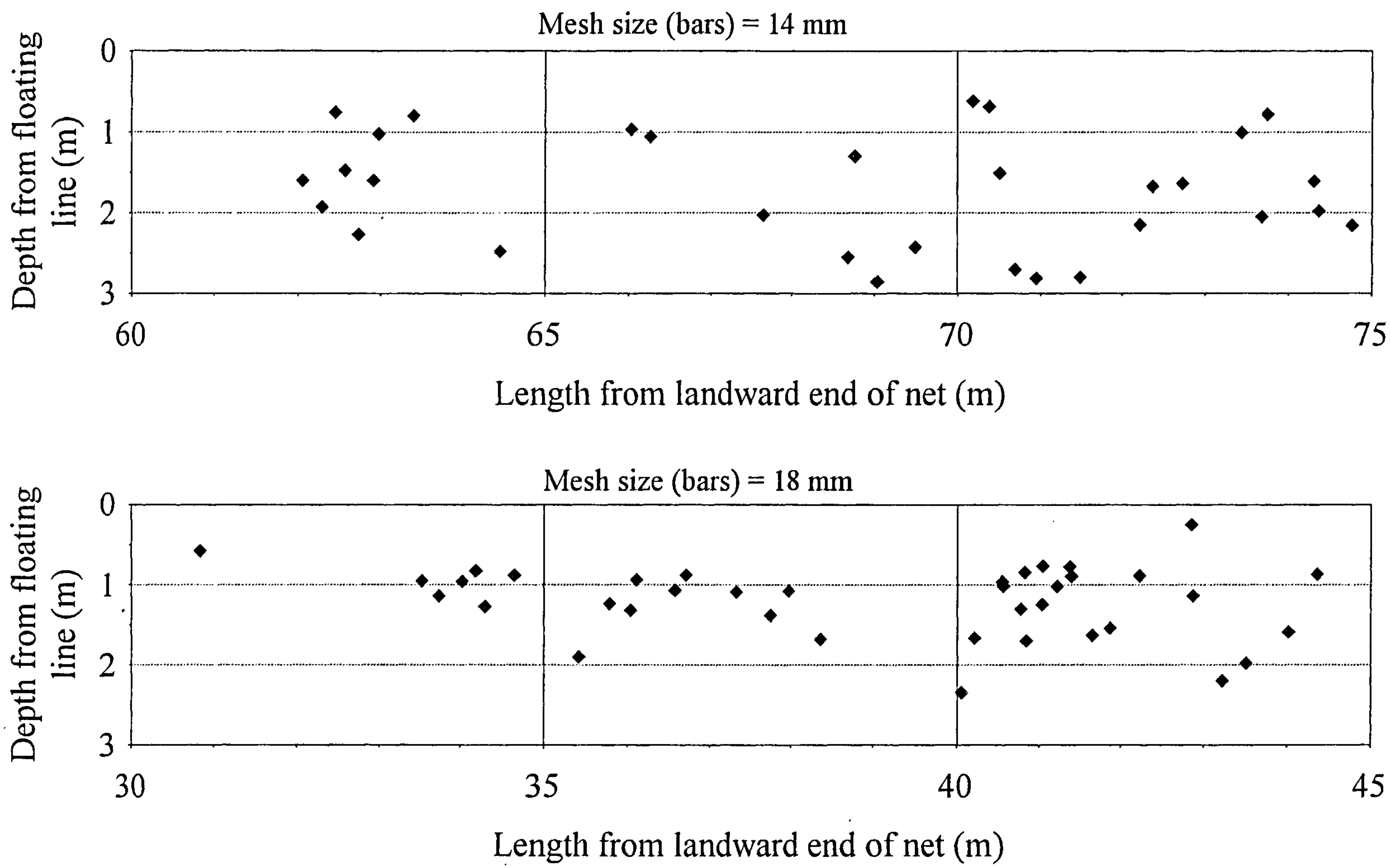

Fig. 4. Distribution of salmon postsmolts in two seleceted panels (14 and 18 mm) in the floating net in the mouth of Kolgrafafjordur 8th of June 1994. Each panel is 15 m long. Depth and length of the nets are shown in the same scale

Table 1. Catch of Atlantic salmon postsmolts (CPUE) caught in Breidafjord Bay, June to September 1993, by floating nets and floating trawl (TRW). Time of last release are given along with catch data for selected stations for the 3 first visitations of nets (if available) following releases. Number of 90 and 120 m long nets are shown, and hours from last release until visitations of nets are given along with hours of fishing. In addition to the releases shown in the table, postsmolts were released (numbers in thousands) July 7 (N=339), July 15 (N=443) and July 21 (N=176).

Time of last release and number released (thousands)		Fishing stations	Number of nets (90 m and 120 m[1])	Visitation (hours after release)	Duration of fishing (hours)	CPUE[2]
21.Jun	**19:45**	1.1	2	22.0	3.5	1.6
			2	46.0	24.0	2.9
			2	47.5	2.0	2.8
		2.1	3	22.5	2.0	3.3
N = 36		3.1	2	18.0	1.5	37.0
			2	23.5	5.5	0.0
			2	27.5	4.0	1.7
09.Jul	**22:30**	1.1	1	18.5	17.0	7.8
N = 310			1	19.5	0.5	106.7
			1	22.0	2.0	80.0
22.Jul	**20:45**	Inward 2.1	TRW	1.3	0.2	732.0
N = 227		Outward 2.1	TRW	3.7	0.8	13.0
09.Aug	**23:30**	1.1	1	21.0	13.0	2.6
N = 163			1	29.0	8.0	0.0
			1	56.0	8.0	0.0
		2.1	2[1]	3.5	2.0	228.9
			2+2[1]	46.0	2.5	1.0
		3.1	1	8.0	8.0	98.5
			1	8.5	0.3	555.5
			1	14.5	6.0	14.8
		2.2	2[1]	5.0	1.0	66.7
		2.3	1	18.0	1.0	11.1
			3+2[1]	19.0	2.0	18.6
26.Aug	**14:30**	1.1	1	5.5	7.5	0.0
N = 37			1	25.5	20.0	0.0
		2.1	2	2.5	1.5	280.8
		3.1	1	4.0	4.0	83.3
			1	4.5	0.2	2133.3
			1	24.0	19.5	2.5
		1.1	1	215.0	17.5	0.0
		2.1	2+1[1]	221.0	3.5	0.0
		3.1	1	213.5	17.5	0.0

[2] For nets = number of postsmolts caught / 1 km net / hour

For trawling = number of postsmolts caught / trawling hour.