International Council for the
Exploration of the Sea

C.M. 1963
Paper L

Administrative Report

S a l m o n a n d T r o u t C o m m i t t e e

1962

By A.E.J. WENT

Denmark

(Knud Larsen)

1. Tagging experiments. In 9 streams, 566 adult sea trout (spawners and kelts) were tagged.

2. Stocking experiments with trout in coastal waters. Thirteen thousand two year-old pond reared brown trout were marked by fin-clipping, tagged by means of internal celluloid tags and liberated directly into salt or brackish waters at 9 localities. The programme of annual stocking experiments in coastal waters with pond reared trout has now been completed and as soon as recaptures cease the results will be worked up and published.

3. Stocking experiments with trout in fresh water. Two thousand two year-old pond reared brown trout were tagged and liberated into the River Varde å. In the River Omme å, 276 brown trout and rainbow trout were likewise liberated after tagging.

4. Analyses of the stocks of young sea trout and non-migratory trout, and the control of the sea trout run, were carried out in some streams in Seeland and in the southern part of Jutland by means of D.C. electro-fishing. In the River Brøns å the sea trout run was studied as usual in the fish pass at the Danish Trout Pond Farmers' Experimental Station.

5. The general investigation of the runs of sea trout, their spawning, etc. in Danish rivers and streams, was completed and the material is now being worked up with a view to publication.

6. Salmon investigation in the Baltic. As usual, statistical data on the Baltic salmon fishery was collected. Diaries were distributed to 30 fishermen in order to obtain information on catch per unit effort. Collections of scales for determination of the age composition of the catches were made from salmon landings at Rønne Fish Market. The stomach contents of 1,071 salmon were examined to investigate the feeding habits of the Baltic salmon.

Finland

(E.Halme)

Two hundred adult salmon, 4,000 salmon smolts and 1,800 trout smolts were tagged during the year.

France

(R.Vibert)

Tentatives de restauration de remontées de Salmonides anadromes

Le Rhin. Le canal d'Alsace ayant dérivé les eaux du Rhin sur une longueur de 50 km, le lit du Rhin ainsi asséché, que l'on peut dénommer le "Vieux Rhin", est alimenté par des eaux souterraines cheminant dans les terrains alluvionnaires grossiers, très perméables, du Pays de Bade et d'Alsace. De ce fait ce "Vieux Rhin", d'une surface de plusieurs centaines d'hectares, est devenu tout à fait favorable aux salmonides.

Pour cette raison, des passes à saumons seront aménagées dans tous les barrages devant être construits à l'aval de ce "Vieux Rhin".

Une écluse à poissons a ainsi été réalisée dans l'usine du barrage de Marckolsheim provoquant une dénivellation d'une dizaine de mètres. Des poissons semi-migrateurs (Chondrostoma, Barbus) ont déjà été vus s'échapper de cette écluse dans le brief amont.

Il a été obtenu du Service de Navigation Allemand qu'il aménage une telle écluse à poissons dans le barrage qu'il construit dans le "Vieux Rhin" à hauteur de Breisach, pour relever la hauteur de la nappe phréatique dans le Pays de Bade.

Fleuves côtiers de la Manche. Les remontées de truites de mer obtenues dans tous les estuaires des fleuves côtiers de la Manche depuis plusieurs années se sont maintenues.

Des captures de truites de mer ont même eu lieu pour la première fois dans l'Orne supérieure, à hauteur de la zone des frayères à saumons désertées depuis plusieurs décennies, et où il était enfoui des oeufs de truites du Dunajec (Pologne) depuis 1954.

L'ascenseur à saumons de Kernansquillec sur le Guer a continué à fonctionner, mais l'enregistrement photographique de chaque remontée n'est pas encore développé.

En mai 1962, il a été marqué et déversé dans la Risle maritime 230 smolts de 14 à 19 cm d'origine norvégienne et produits en étang.

Les saumoneaux n'ayant pas pris la livrée de smolts furent remis en étang.

La Fédération de Pêche du Calvados a déversé en novembre 1962 15.000 truitelles de Mer Baltique dans la Touque et la Vire.

La Loire. l'été particulièrement sec de 1962 a causé la mort de tous les saumons qui n'étaient pas remontés au-dessus de Brioude (altitude 430 m), alors que certaines années, les saumons frayent depuis 50 km à l'aval de Brioude. Cette mortalité n'a permis la reprise d'aucun géniteur dans le piège de Brioude.

Il a été à la poursuite des ensemencements en oeufs de salmonides de la Baltique, ceux-ci ne semblant donner lieu qu'à des remontées de petits poissons (1 à 2 kg) et seulement sur 100 à 200 km dans les estuaires de l'Atlantique.

Faute d'oeufs de saumons du bassin de la Loire, il a été affecté 20.000 oeufs de saumons des Gaves à l'ensemencement de la Haute-Gartempe. Etant donné la rareté des oeufs de saumons atlantique, ces oeufs ont été mis en incubation artificielle et les alevins à en provenir seront élevés en étang froid de la Haute-Gartempe jusqu'au stade smolt. Ces smolts seront bagués et déversés en Basse-Loire.

La Garonne. Le piège à saumons installé dans l'échelle à poissons du barrage de Toulouse n'a pas bien fonctionné en raison de son encombrement perpétuel par des corps flottants. Aucun saumon n'aurait été vu au pied de ce premier barrage depuis l'océan, alors qu'il en a été capturé une trentaine, de 3 à 5 kg vers Agen, à 250 km de l'océan et à 100 km à l'aval du barrage ci-dessus.

l'ensemencement de l'Ariège en oeufs de saumons des Gaves a été poursuivi.

L'Adour. Une écluse à saumons a été mise en fonctionnement sur le Gave d'Aspe et des remontées de poissons ont été constatées.

Germany

(R.Kändler)

The liberation of young sea trout to reinforce the stocks in the western Baltic was continued. About 80,000 fingerlings, 4 to 5 cm in length, and 12,000 smolts, 14 to 18 cm in length, were released into some small rivers of the Baltic coast of Schleswig-Holstein. A total of 1,800 smolts were tagged with Carlin-type tags.

Work on the stock of salmon and on the stomach contents of salmon in the Baltic has been continued. Scales for age determination were taken from more than 1,000 individuals and more than 3,000 individuals were weighed and measured.

Further attempts were made with regard to the usefulness of hooks of the size Mustad No. 6 (19 mm between tip and side). Eleven diaries were handed to the fishermen in order to get more information on the catch per unit effort, the fishing places and weather conditions.

Twenty-four clean salmon, 50 to 75 cm in length, were tagged in December 1962 in the region north of the peninsula of Hela. As in former experiments, a double-barbed nylon dart with a coloured plastic tube containing a label, was pierced through the flesh and fixed between the basal fin ray supports of the dorsal fin.

Of 62 adult salmon, 65 to 85 cm in length, tagged in the same way in the southern Baltic in November 1960, 15 fish (24.2%) were recaptured during the year 1962. Nine tagged fish were caught in the southern Baltic, and 6 taken in the vicinity of the Bothnian river were ready to spawn. During 1962 no further recaptures have been reported.

Ireland

(A.E.J. Went)

Tagging of salmon taken by commercial drift nets operating along the north coast of County Mayo was undertaken in 1962. Altogether 156 fish were tagged and 28 tags (17.9 %) were recovered. Recaptures were made along the Irish coasts from the Kerry Blackwater (south-west of Ireland) to Cushendun, Co. Antrim (north-east) and a single recapture was reported from Ängelholm on the south-west coast of Sweden, a minimum distance of approximately 1760 km from the tagging station. This is the longest distance recorded for any salmon tagged in Irish waters and the fish was the first to be recaptured on the continent of Europe. During the year, 2,063 kelts of salmon and grilse were

tagged, mainly in connection with hatchery operations. A total of 64 recaptures were recorded, mainly of fish tagged in previous years.

Material consisting of sets of salmon and grilse scales with relevant data was collected from the Rivers Corrib and Moy. A review of the scientific work done on salmon in Ireland was in course of preparation during the year.

The effects of a drainage scheme on the fish life in the River Moy were studied during the year and an intensive biological study of the River Lee, the salmon stocks of which have been adversely affected by hydroelectric development, was also undertaken.

Work on the predatory effect of pike on the stocks of salmonid fishes was continued during the year.

A small lake, Lough Knader, was stocked with unfed salmon fry in 1959 and the first stage of the investigation into the production of smolts therein was completed during the year and a report was prepared.

Kelts found dead in certain Irish rivers were again examined bacteriologically when it was found that the incidence of furunculosis was negligible.

During the year the Salmon Research Trust of Ireland Inc. continued its programme of scientific investigations into the stocks of salmon and sea trout of the Burrishole River and the Foyle Fisheries Commission undertook investigations into the movements and age of salmon entering the River Foyle, as well as a study of the feeding potentials of some of its tributaries.

Norway

(L. Rosseland)

Salmon Taggings

Smolts. In the Lone River, one of the smallest salmon rivers in Norway, 950 salmon smolts were tagged in the spring a short time before their seaward migration. The fish were caught by electrical fishing gear.

In the Eira hatchery near Molde 3,000 salmon smolts were tagged, 1,000 were liberated in the middle of April, 1,000 in the beginning of May and the last 1,000 in the beginning of June.

In the Lundesokna hatchery, near Trondheim, 7,499 salmon smolts were tagged from the beginning of May until the middle of June. Earlier experiments have shown that the time for liberation is of greatest importance, and it is hoped to obtain better results from tagging experiments when the fish are liberated at the right time.

Clean salmon. Clean salmon were tagged at four stations on the west and north coasts of Norway and a few fish, caught in drift nets, were tagged off the Finnmark coast. At Kinn, near Florø, 111 salmon were tagged and 71 (63.9 %) were recaptured, all in Norway. At Tarva, near the mouth of the Trondheimsfjord, 353 salmon were tagged and 199 (56.4 %) were recaptured, all in Norway. Of these, 73.4 % were recaptured in the sea and 26.6 % in rivers. At Støtt 60 km south of Bodø, 180 salmon were tagged and 119 (66.1 %) were recaptured, all in Norway. Of these, 81.5 % of the fish were caught in the sea and 18.5 % in rivers. At Breivik, Sørøya, Finnmark, 671 salmon were tagged and 221 recaptured. One hundred and fifty-four fish were recaptured in the sea in Norway, 44 were caught in Norwegian rivers, 4 on the Finnmark side of the Tana River and 19 in the Soviet Union (Kola -White Sea).

In the last 8 years the drift net fishery for salmon at the Norwegian coast has increased. Most of this fishery is carried out near the coast, but some of the larger vessels have fished as far as 25 to 30 nautical miles from the shore. There has been some doubt whether this fishery has exploited maiden salmon on their feeding grounds or mature salmon on their way to the spawning rivers. In the summer of 1962 the sexual organs of more than 600 salmon caught by drift nets and about 600 caught in bag nets at the coast were examined. The material showed that there were no marked differences between salmon caught by drift nets and those caught by bag nets in the development of the sexual organs or in the weight/length relationship. The drift net fishery so far, therefore, appears to have exploited the same salmon stock as the bag net fishery at the coast.

Poland

(F. Chrzan)

Salmon and sea trout investigations in the Baltic were carried out in the autumn-winter (drift line season) and in spring (drift net season). During the months January to March, 600 salmon landed at Gdynia were measured and 200 specimens were collected and analysed. The mean length of fish caught by hooks was 77.4 cm. Observations at sea into the factors influencing the catch were continued.

The drift net catches of salmon in the spring of 1962 were rather small. Only 150 fish were examined for length and weight. Scales were also taken for age analysis.

In comparison with the fish caught in the previous year the salmon taken in drift nets in 1962 were rather small. The mean length of these fish was 80.2 cm. The catches of sea trout off the Polish coasts were very good, particularly in late autumn and at the beginning of the winter. From those fish landed at Gdynia, 2,000 specimens were measured and weighed, and 400 scale samples were worked up. The length of sea trout taken in Gdańsk Bay was 53 to 98 cm, with a mean of 68.8 cm.

From the River Drawa 66 salmon spawners were examined. The length of the fish ranged from 69 to 144 cm, with a mean of 109.7 cm. Scale examination indicates an extraordinary high growth rate in these fish. In April, 1,100 one year-old parr and smolts were tagged and released into the River Drawa.

The Fisheries Institute of Inland Waters worked up the material regarding stocking experiments with sea trout in the River Vistula. The mean length of fish of the same age varies from year to year and the causes of this are about to be studied.

Tagging experiments were carried out on sea trout in the mouth of the River Vistula and in coastal waters, where 8,395 smolts were tagged and liberated. During 1962, 196 tagged fish were recaptured. Since 1958, 524 Vistula sea trout have been recaptured. The numbers of fish recaptured by fishermen of various Baltic countries were as follows:- Poland, 291; Sweden, 62; German Federal Republic, 36; Denmark, 11; U.S.S.R., 7; Finland, 5; German Peoples Republic, 4.

In the Department of Fisheries of the College of Agriculture in Cracow the following work was done under direction of Professor Zarnecki:-

1. Data relating to tagged Pomeranian sea trout liberated in 1960 and recaptured in 1962/63 were collected for examination.

2. At the experimental station at Mydlniki the sixth generation of sea trout reared in ponds was obtained for tagging purposes in 1963. The experiments conducted since 1942 by Dr. Skrochowska will, it is hoped, eventually elucidate the problem of the homing instinct in sea trout.

3. Swedish salmon, reared from ova imported from the River Indalsälven, were kept in the hatchery for liberation into the Dunajec River in the spring of 1963.

4. The scales from 100 spawners taken on the spawning beds in the Rivers Raba and Dunajec were collected for age and growth determination.

5. The scales of sea trout entering the Vistula in the period January-May were also collected.

6. The weight of the gonads was noted in 400 sea trout entering the Pomeranian rivers and 100 sea trout entering the River Vistula.

Sweden

(B.Carlin)

Salmon research in Sweden is mainly directed towards problems relating to the rearing and release of smolts, including experiments with varying diets, disease control and selective breeding. The annual production of salmon smolts and young sea trout from rearing stations in Sweden increased to 1.2 millions in 1962.

Tagging operations have included 69,000 salmon smolts, 10,000 young sea trout, 1,350 adult salmon and 275 adult sea trout. The number of adult salmon recaptured in 1962 from previous tagging experiments, amounted to 18,000.

Studies on the biology, especially the migration, of natural smolts have been made at the trap in the River Rickleån, where 3,000 smolts were caught, registered and tagged.

United Kingdom

I. England and Wales

(F.T.K. Pentelow)

Salmon and sea trout investigation,
River Axe, Devon

The trapping installation on the River Axe was fished for all but 92 hours of the year. Freshet conditions (28 cm to 63 cm of additional water) were fished on 20 days, minor flood conditions (63 cm to 126 cm of additional water) were fished on 16 days and severe flood conditions (126 cm to 190 cm of additional water) were fished on 10 days during the year. This year it proved possible to trap the entire runs of salmon smolts and sea trout smolts, 7,179 and 6,177 respectively, being released after tagging and measurement. The upstream migration counted through the trap was 248 salmon and 2,443 sea trout but there is known to have been some escapement of both species upstream during high floods in September and November.

International salmon smolt tagging experiment

This year the experiment between England and the Republic of Ireland, cancelled last year through lack of smolts, was carried out on the River Axe installation. Totals of 1,003 and 998 smolts were tagged respectively.

The Usk, Wye and Severn salmon investigations

The tagging of salmon smolts in these three rivers was again carried out in 1962, as follows:-

River Usk	2,441
River Wye	5,007
River Severn	5,098
	12,546

During the 1962 fishing season 21 recaptures of tagged salmon were reported; seven of these were Severn smolts, all but one being recaptured in that river; two were Usk smolts recaptured in the Severn Estuary and the tributary Parrett Estuary; and the remaining 12 were Wye smolts, of which 3 were recaptured in the Wye or its estuary, six in the Severn Estuary, two in the Parrett Estuary and one was recaptured in the sea off the west coast of Greenland.

II. Scotland

(K.A. Pyefinch)

The first stage of the investigation of the leaping behaviour of salmon and trout has been completed and a report has been published on the results obtained. Further studies are in progress, particularly on visual orientation and responses to vibrations. Field observations have also been continued and it has been found that some obstructions serve to filter out certain classes of salmonids and thus may, for example, favour the upstream passage of trout and limit the number of salmon on the spawning ground above the fall.

Studies have been made on the extent to which surface contour affects the locomotor activity of trout alevins, both in the light, when the activity was observed directly and in darkness, where the disposition of alevins, offered a choice between plain and grooved surfaces, were recorded photographically after one hour. Observations have also been made on the growth of trout alevins by determining the dry weight of embryo and yolk at different stages of development. The results indicate that the dry weight of the embryo reaches a maximum and starts to decrease before all the yolk is absorbed. This may have important effects on survival especially as the results of other investigations on the emergence of alevins from the gravel indicate that emergence may not take place until tissue breakdown has begun.

The work on smolt production from the River Bran (Ross-shire) has been completed. The results show that the number of smolts produced from this river system is not unusually low but that serious losses occur as the fish migrate downstream, due to the interacting effects of predators in the lower reaches of the system and the delays caused by the artificial obstructions produced by hydroelectric developments. It should be possible to reduce these heavy losses by transporting smolts to a point below the lowermost dam and this experiment will be started in 1963. Another aspect of the work on the Bran system, survival following planting with unfed fry at different densities, is being continued and extended and observations are also being made on the drift fauna of these Highland streams, since this seems likely to be an important element in the food supply of young salmonids in these streams.

Observations have been continued on smolt migration in the Tummel system. During 1962, the run was later and the rate of movement slower than in previous years. Further investigations have been made into the effects of predators on the smolt migration in the Tummel system and these show that the pike in Loch Tummel are probably not serious predators but that brown trout of about 1 lb weight or greater may be more important in this connection. Preparations have been made to study the survival of fry or underyearlings in one of the lochs which is connected with the River Tummel.

More comprehensive studies have been made of the effects on smolts of passage through the turbines at Clunie power station. Improvements were made in the facilities for recapturing fish released at various points in the system but, although the whole width of the tailrace was spanned by nets, the overall recapture rate was only 64 %. These tests were carried out during April and May and a marked increase in mortality, for any one release point, was found between tests conducted later in this period compared with those conducted earlier. Some preliminary tests were made at Invergarry power station during August and it is hoped that these will be extended during the spring of 1963.

The analysis of the records of commercial salmon catches has been continued and this has been supplemented by studies of samples of the catches made at representative coastal and river netting stations.

The series of tests of smolt tags has been continued by the initiation of a test between Eire and Scotland. A preliminary review of the results obtained in the earlier series of tests in which Scotland had participated shows that the recapture rate from

tests started in the Baltic is much higher than that from tests started elsewhere and, in this, the Scottish results are very similar to those obtained by England, Norway and Sweden.

In 1961 a small experiment was started in the River North Esk to compare the returns from hatchery-reared and wild smolts. The overall proportion recaptured (2.6%) during 1962 was higher than in any similar experiment conducted in Scotland since the war; hatchery-reared smolts gave a recapture rate of 2.0%, whereas the corresponding value for the wild smolts was 3.0%. Further recaptures should be recorded during 1963.

During the twelve months ended 30. September 1962, 121 fish were received for examination in connection with the statutory diagnostic service for furunculosis. A total of 40 cases of furunculosis was diagnosed, together with 3 cases of Dee disease. A report on the occurrence of furunculosis in kelts has been published. Further investigations have been made of the characteristics of the causative organism of Dee disease and it now seems likely that this disease is the same as kidney disease in Pacific salmon.

Work on the bottom fauna has again been mainly concerned with studies on nursery streams. In particular, the relationship between the number of animals and the amount of vegetable matter has been investigated. A correlation has been found between these two quantities and experiments have been started to discover the basis of this correlation.

The investigations of methods for the detection and estimation of toxic substances in fish has been continued, attention again being given chiefly to cyanide, DDT and dieldrin. Studies have also been made of the chemical composition of rain and its relationship with the chemical composition of stream waters in various parts of Scotland and on the use of anion-exchange resins for concentrating small amounts of dissolved phosphate in natural waters.

U.S.S.R.

(G.V.Nikolsky)

In 1962 investigations were carried out on Atlantic salmon, Baltic salmon, pink salmon and chum acclimatized in Atlantic waters.

Atlantic salmon

The Polar Institute of Marine Fisheries and Oceanography, Murmansk, continued regular observations on the conditions of Atlantic salmon, entering the rivers of the Kola Peninsula. In the River Lebyazhaya (the basin of the River Ponoy) and in the River Zap, porey eggs pocketing in redds were investigated. The number of eggs in the nests of redds made by a single female is close to its total fecundity. The survival rate of the eggs in the River Lebyazhaya was very high, close to the survival of the eggs in the fish hatcheries.

The northern department of PINRO (Arkhangelsk) carried out work on the Atlantic salmon in the North Dvina and Pechora. In the North Dvina the investigations were continued with the aim of choosing a suitable place for a fish hatchery. In the Pechora material was collected for estimating the size of the Atlantic salmon run in the Lower Pechora. The Pechora-Ilychsky reservation took part in these investigations. In 1962 the runs of Atlantic salmon were about average. The catch at the barrage in 1962 amounted to 241,900, for the Komi ASSR 365,200 and for the Pechora a total of 278,400. The average catch over 36 years has been 350,000. Material was collected for estimation of the age and sex composition, the average weight and the proportion of previous spawners.

Atlantic salmon were also tagged in order to estimate the number of Pechora salmon at a barrage constructed on the migration route for Atlantic salmon (Malaja Pechora, lower Mesino). In 1962 below the barrage, more than 2,000 migrating Atlantic salmon were tagged. The catch of tagged fish at the barrage was 40.6%. By consideration of the catches of Atlantic salmon at the barrage and the percentage of tagged fish, the stock for 1962 was estimated at 80,000 fish, which is about average. From the tagging data the rate of migration would appear to be 25 km per day. In the region of the barrage, however, a distance of 14 km was covered by the Atlantic salmon at a speed of 9 km per day, which suggests that having reached the barrage, the fish stopped near it and migrated downstream.

The State Research Institute of Lake and River Fisheries, Leningrad, continued investigations connected with the reproduction of the Atlantic salmon stock. As far as artificial propagation of Atlantic salmon is concerned most attention was paid to the study of morphological-physiological conditions in young fish of different ages during the two years that smolts were reared in the Arctic. It was found that in autumn, the one year-old fish from the artificial basins when fed with food containing vitamins did not differ from the one year-old fish from natural basins in so far as length and weight were concerned, but were rather smaller than one year-old fish from the ponds. One year-old fish of one gramme in weight withstood wintering in artificial basins very

well. In the second year the rate of growth of the young salmon in the hatchery is much higher than that in the river. In the second summer the weight of the young salmon increased 4 to 6 times. At the age of 19 or 20 months (February-April) a proportion of the young fish began to become silvered. At the period of smoltification (July) silvering was observed in 25 to 30% of the two year-old fish.

The main physiological indices (blood, liver, thyroid gland, biochemical composition, reaction to increased salinity, etc.) for one year-old fish from the artificial basins are somewhat worse than for one year-old fish from the ponds. With further rearing these differences disappear.

The study of the young salmon from the hatchery after their release into the river showed that growth and characteristics of the smoltification of young fishes from the hatchery (one and two year-olds) do not differ materially from those in the young salmon derived from natural spawning.

The return of the adult salmon has only just begun. Eight tagged fish which have lived in the sea for one year (0.1%) were caught.

The investigations into the size of the salmon populations and the effectiveness of natural reproduction were started in 1962 in the River Umbe (Murmansk region). It was found that the Atlantic salmon of this river differ considerably from those in the neighbouring River Varzuga with respect to biological groups in the catch, size and age composition of the migrating fish.

In 1962 investigations on the biology and migration of the Atlantic salmon in the River Volohga (Arkhangelsk region) were continued.

Baltic salmon

The State Research Institute of Lake and River Fisheries has carried out the tagging of salmon. In 1962, 227,000 one year-old fish were released at the Neva fish hatchery and 109,000 of these fish were fin-clipped by removal of the adipose fin. As the result of this a small salmon stock, artificially reared at the Neva fish hatchery, is at present in the Baltic Sea. Baltic countries fishing salmon are asked to record the catch of fin-clipped fish.

The Baltic Institute of Fisheries is also engaged in researches into salmon as follows:-

1. Investigations under natural conditions. The population dynamics of salmon in the eastern Baltic were studied as well as the conditions of the stock, the yield of the different year-classes, the influence of the fishery on the stock, the influence of the conditions of life of the parr on their physiological state, the smolt age, the rate and variation of growth in the sea, fecundity, the analyses of food and feeding conditions of the young salmon in the Latvian rivers. The salmon runs to the rivers were also studied and a method of forecasting the migration rate was devised.

2. Artificial reproduction. Methods for increasing the rate of growth of young salmon fed on artificial food, with the mixture of antibiotics and trace elements were developed and the process of smoltification and the way to induce it were studied.

Pacific salmon

The Polar Institute of Marine Fisheries and Oceanography, Murmansk, continued the investigations on the spawning of Pacific salmon in the rivers of the Kola Peninsula. The data obtained on the acclimatization of Pacific salmon showed that the bulk of the young salmon released from the hatchery were eaten by predators (in the rivers by dosk salmon and others, and in the sea by young cod and herring). In 1961 the eggs of pink salmon developed successfully. In June and July 1962, a good run of young salmon was observed. During the period of migration the young salmon were feeding and due to this their size increased by the end of the run from two times (region of the Ponoy) to four times (eastern Murmansk).

In 1962 the Murmansk Marine Biological Institute, USSR Academy of Sciences, sent five working parties to the rivers of eastern Murmansk to observe the spawning of pink salmon. Three parties were sent to the River Muchla (tributary of the River Teriberka) to investigate the development, state and survival of the eggs of pink salmon in the redds during natural spawning in the autumn of 1961. Two other working parties went to the rivers of western Murmansk: Zolotuju, Ryndu, Peronju and its tributary Belousikhu to study the run of pink salmon (and perhaps chum) which had been anticipated and its biology, spawning and relationship to the local river fauna. Due, however, to almost the complete absence of runs of pink salmon and chum in 1962 only a small part of the work planned could be carried out. The opening of the redds in the middle of April 1962 in the River Muchla showed that the survival number amounted to between 90% and 96% of the contained eggs which had been deposited during the autumn of 1961. The rate of development of the embryos in the redds was very varied, evidently depending on the period of spawning in the autumn, the variations being from 26mm to 32 mm in length. The opening of the redds in the pre-smolt period of the fry showed also a high survival percentage. The smoltification of the young pink salmon began in the first half of June and in a few days, when the temperature increased to 5°-6°C, it became general.

The number of smolts was much higher than in previous years. The length varied from 31 mm to 37 mm and the weight from 185mg to 217mg. During the period of smoltification the young salmon were feeding more intensively than before, this evidently being connected with the twenty-four hours of daylight.

From observations on the development of the eggs and the smoltification of the young salmon in the rivers of eastern Murmansk it can be concluded that under natural conditions in the rivers flowing into the Barents Sea normal fecundity and development of the eggs of the pink salmon are possible.

The morphology of the eggs and fry of pink salmon produced naturally in the rivers of the Murmansk region showed no essential differences from those produced in the Pacific area. The study of the fauna of the redds has now been completed. The main conclusions of this work are the following:-

(a) Population of the spawning grounds by the invertebrate fauna begins immediately after the spawning, and
(b) some of the larval insects which accumulate in the redds may harm the eggs contained, thus reducing the survival rate.

Publications

Azbelev, V.V., Grinyuk, I.N., Surkova, E.U., Surkov, S.S., & Yakovenko, A.A. — "Results of the natural spawning of pink salmon in the rivers of the Kola peninsula in 1961". Sci.-Tech. Bull. PINRO, No. 4 (22).

Azbelev, A.A., Surkov, S.S., & Yakovenko, A.A. — "Materials on the biology of the pink salmon, acclimatized in the basins of the White and Barents Sea". Ibid., No. 2/3, (20-21).

Bakshtansky, E.L. — "The pink salmon in the lake". Ibid., No. 4 (22).

Bozhko, A.M. — "The age changes of relative size of the internals of the lake salmon", in "The biology of inland basins of Pribaltica". Acad. Sci. Press, Moscow.

Cuinat, R. — "Dangers de la pêche électrique. Précautions à prendre". Bull. franç. Piscic., 204: 125-31.

Danilenko, P.A. — "The pink salmon migration to the river Volonga". Sci.-Tech. Bull. GOSNIORKH, No. 15. Leningrad.

Danilenko, P.A. — "On the groundlessness of the using of minimal limit on the running Atlantic salmon in the river Volonga". Bull. Tech. Inform., No. 2. Arkhangelsk.

Evropeizeva, N.V. — "The comparative analysis of the process of desmoltification in the young of different ecological forms of Atlantic salmon". Sci. Notes Leningrad State Univ., No. 311, Ser. Biol., Suppl. 48.

Evropeizeva, N.V. — "Development of a relative quantity and the question of the importance of dwarfish males of ecologically different representatives of the genus Salmo". Probl. Ecol., 5.

Evtyukhova, B.K. — "The condition of the stock and the perspectivity of the fishery of the Baltic salmon". Trans. Conf. Young Specialists. NIRKH, Riga.

Ephimov, B.I. — "The survival of the pink salmon in the period of the embryonic development". Sci.-Tech. Bull. PINRO, No.4.

Fontaine, M., & Fontaine, Y.A. — "Thyrotropic hormone (T. SH) in lower vertebrates". Gen. comp. Endocrinol., Suppl. 1: 63-74.

Fontaine, M., & Leloup, J. — "Le fonctionnement thyroidien du saumon adulte (Salmo salar L.) à quelques étapes de son cycle migratoire". Gen. comp. Endocrinol.:317-22. 1962.

Fontaine, M., & Olivereau, M. — "Nutrition et sexualité chez les poissons". Ann. Nutrit. Aliment., 16: A 125-52.

Foyle Fish. Comm. — "Tenth Annual Report". Dublin and Belfast.

Hewetson, A. — "Furunculosis in salmon kelts". Nature, Lond., 194: 312.

Hewetson, A. — "Furunculosis in salmon kelts". Nature, Lond., 196: 1009.

Hewetson, A. — "Salmon of the River Owenea". Rep. Sea and Inland Fish. 1961. Dublin.

Hewetson, A. "Salmon of the River Corrib in 1959, 1960 and 1961". Rep. Sea and Inland Fish. 1961. Dublin.

Holden, A.V. "A simple automatic water sampler". Effl. and Water Treatm. J., 2: 338-40.

Holden, A.V. "A study of the absorption of C-14 labelled DDT from water by fish". Ann. appl. Biol., 50: 467-77.

Ivlev, V.S. "The smoltification of the salmon and its biological meaning". J. Gen. Biol., 23 (1).

Krussel, I. "On the biology of the spawning of the sea trout in the river Pidula", in "The biology of the inland basins of Pribaltica". Acad. Sci. Press, Moscow.

Livshiz, M.G. "The cause of the massive loss of the Atlantic salmon in the river Varzuga in 1960". Sci.-Tech. Bull. PINRO, No. 4 (22).

Malikova, E.M. "Biochemical changes of the organisms of the Atlantic salmon young at the stage of smoltification", in "Biology of the inner basins of Pribaltica". Acad. Sci. Press, Moscow.

Melnikova, M.N. "The methods and results of the tagging of the smolts of Atlantic salmon in the river Varzuga". Sci.-Tech. Bull. GOSNIORKH, No. 15. Leningrad.

Mills, D.H. "The goosander and red-breasted merganser in Scotland". Wildfowl Trust, 13. Ann. Rep.: 79-92.

Mills, D.H. "The goosander and red-breasted merganser as predators of salmon in Scottish waters". Sci. Invest. Freshwat. Fish. Scot., No. 29: 10 pp.

Mitans, A.R. "Some materials on the biology of the salmon young in the rivers of Latvian SSR". Trans. Conf. Young Specialists. NIRKH, Riga.

Moriarty, C. "Movement of salmon". Nature, Lond., 196: 595.

Palayer, A. "Influence de l'alimentation et de la thyroxine sur la morphologie du pancréas de l'anguille (Anguilla anguilla L.)". C.R. Soc. Biol., 156: 786-90.

Pentelow, F.T.K., Pyefinch, K.A., & Went, A.E.J. "Researches on the Atlantic salmon in Great Britain and Ireland". Salmon and Trout Assoc., London Conf.

Pentelow, F.T.K., Pyefinch, K.A., & Went, A.E.J. "Researches on salmon in North America". Salmon and Trout Assoc., London Conf.

Persov, G.M. "The process of anatomical and cytological differentiation of the sex of the salmon of the genus Salmo". Sci. Notes Leningrad State Univ., No.311, Ser. Biol., Suppl. 48.

Persov, G.M. "The catch of Neva salmon released into the river as one year-old". Sci.-Tech. Bull.GOSNIORKH, No. 15.

Privolnev, T.I. "The characteristic of the salmon spawning grounds in the river Narva". Ibid., No. 15.

Pyefinch, K.A. "Scottish freshwater fish". Scot. Counc. (Developm.& Industr.) Symp. Natur. Resources in Scotl., pp.163-68.

Salmon Research Trust of Ireland, Inc. "Annual report for 1961". Dublin.

Shearer, W.M. "Seals and salmon nets". Brit. Ecol. Soc. Symp. on The Exploitation of Natural Animal Populations, pp. 312-15.

Smith, I.W. "Furunculosis in kelts". Sci. Invest. Freshwat. Fish. Scot., No. 27: 12 pp.

Stuart, T.A. "The leaping behaviour of salmon and trout at falls and obstructions". Ibid., No. 28: 46 pp.

Thurow, F. "Über Qualitätsschwankungen und die Bedeutung der Fettspeicherung beim Ostseelachs (Salmo salar L.)". Arch. Fischereiwiss., 13: 52-65.

Vernidub, M.F. "The experimental analysis of the processes, provoked by resin phenols of the Baltic sâmon in the larval period of the life". Sci. Notes Leningrad State Univ., No. 311, Ser. Biol., Suppl. 48.

Went, Arthur E.J. "Salmon of the Bundorragha River". Rep. Sea and Inland Fish. 1961. Dublin.

Went, Arthur E.J. "Irish Sea Trout. A review of investigations to date". Sci. Proc. Roy. Dublin Soc., Ser. A. 1, 10: 265-96.

International Council for the
Exploration of the Sea

C.M. 1963
Madrid
Salmon and Trout Committee

Resolutions

1. That the comparative tagging experiments be repeated to compare the efficiency of tags and tagging methods on smolts liberated in the rivers of the West Coast of Sweden.

2. That the possibility of a comparative test of European and Canadian tagging methods should be explored with the Fisheries Research Council of Canada.

3. That participating countries be invited to circulate a folder containing scale samples from not more than 12 fish; the fish if possible, be of known age but the scales to be unselected and unsorted. Each participant may, if he wishes, include his own interpretation of the scales and any other material e.g. photographs. These folders should be circulated in accordance with a programme arranged by the Chairman.

4. That in view of the recent developments in fishing for salmon in the sea in that part of the Council's area outside the Baltic member countries should be invited to conduct investigations into the effort of such fisheries on the stocks of salmon.