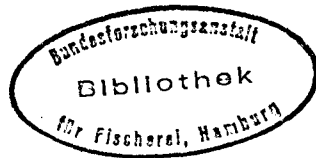


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SURVIVAL OF UNDERSIZED SALMON AFTER RELEASE FROM THE TRAP NET

by

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Abstract

There is a minimum size limit for salmon in the Baltic Sea. Salmon under 60 cm have to be released from the catch except in the c. 300 km northernmost part of the Bothnian Bay. The fish are usually not physically hurt by trap net fishing while other fishing methods may not be as gentle. There has, however, been considerable doubt whether the released fish will survive.

An experiment was conducted where under 60 cm salmon caught with trap net were caged. A majority of them survived the caging period of up to ten days. The consequences of discarding the undersized salmon are discussed.

1. Introduction

Minimum length of Atlantic salmon in the catch is 60 cm with an exception of 50 cm in the northernmost 300 km of Bothnian Bay. The undersized individuals must be released. This is applied to all kind of fishing in the sea and all kinds of gear in Finland

(Fishery regulation 1993). There has been considerable doubt whether the released fish will survive. Trap net fishing can be considered a gentle fishing method. The fish are in principle not physically harmed. They are mainly stressed by the presence of trap net panels and warm temperature of the surface water. The fish are not able to lower their body temperature by swimming or deep diving. Hauling of the trap net also stresses them. The undersized fish are assumed to be stressed by the handling by fishermen e.g. when they first are lifted to the warm surface and to the boat and then thrown overboard. At the release they sink down to the cold bottom layers. This exposes the fish to rapid changes of both pressure and temperature.

A field experiment was conducted to see if trap net fishing defects the undersized salmon so much that they do not survive after being released.

2. Material and methods

The site of the experiment was north of Vaasa, in the Bothnian Bay, Baltic Sea (fig 1). The depth of the sea was 17 m in one and 8 m in the other site. The time of the experiment was July 1-30, 1992. July is the time when most of the undersized salmon are likely to be caught in this area. Two trap nets of basically the same construction were equipped with additional cages (fig 2) near the fish bags. The cages were lowered down to the bottom after refill and observation.

The trap nets were hauled daily. The undersized salmon that otherwise would have let free were caged. If some day the trap net caught many undersized fish the previous ones were released. All the released fish were caged at least for two days. Sometimes the fish were marked with a scarr in their tails to distinguish between the cathing dates. The number of living individuals was recorded daily. In July 19 and 20 the sea was too rough for observations of caged salmon.

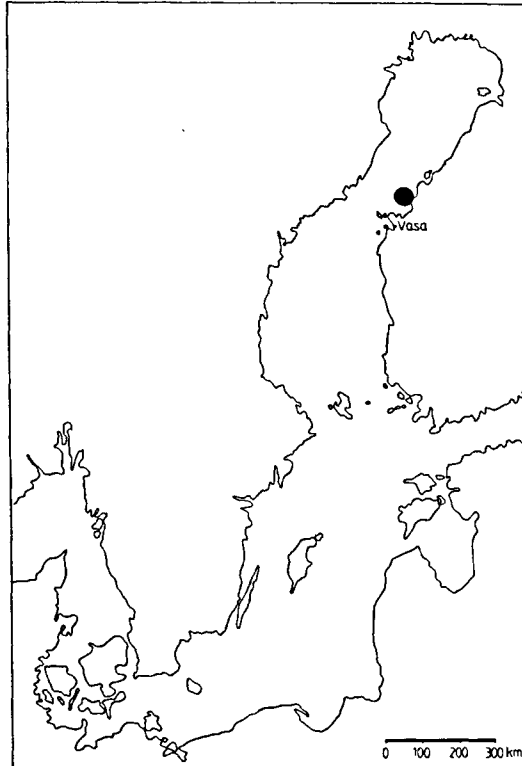


Figure 1. The site of the experiment in the Bay of Bothnia (Baltic).

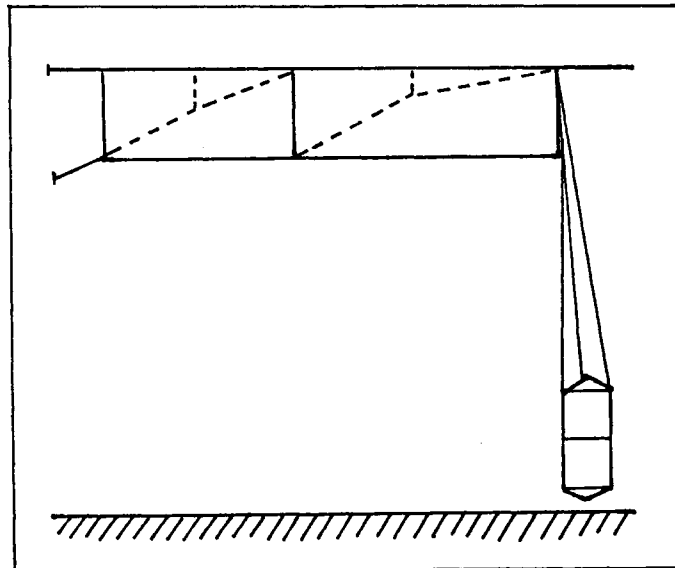


Figure 2. The setup of the trap net and the cage in the experiment.

3. Results and discussion

During the experiment 54 undersized salmon were caught and caged. Together 35 salmon (65%) survived their caging periods and 19 died in the cages (fig 3). The fish that did not survive lived on the average 4.4 days in the cage before they died. One fish died the very same day it was caged and one lived eight days before it died. Between July 18 and 20 there was a strong current in the sea due to the change of wind to the opposite direction. That may have pressed the fish against the cage walls and thus caused the death of together 8 salmon in the cage (fig 4). Most of the undersized salmon were caught by the trap net where the depth of the water was 17 m. Only five undersized fish were caught by the other trap net of 8 m water depth.

Presuming that for instance 5% of the catch by number are too small, the consequences of discarding the salmon under minimum size limit can be estimated. The yearly salmon quota for Finland is 146 250 salmon in 1993. The small fish of about 2 kg are discarded and fished later at the average weight of 5 kg. The increase in the catch would sum up to 22 tons yearly. The survival rate of 65% does not effect the total average catch of 700 - 800 tons as the quota is filled anyway. As the quota is given in number of fish instead of weight it is obvious that big fish are preferred.

Caging of the fish as a method has a few drawbacks compared with tagging. Caging stresses the fish and can also damage them otherwise. On the other hand caging may also protect the fish for example from bites of bottom fauna.

The spawning migration of the Atlantic salmon starts from the Baltic Proper, advances to the Bothnian Sea, Bay of Bothnia and finally reaches the spawning rivers at the Northern end of the Gulf of Bothnia. The spawning migration starts early in the spring and advances to the north as the ice cover melts and the spawning rivers run free. The first to spawn are wild adults followed by planted salmon. Some of the young premature males

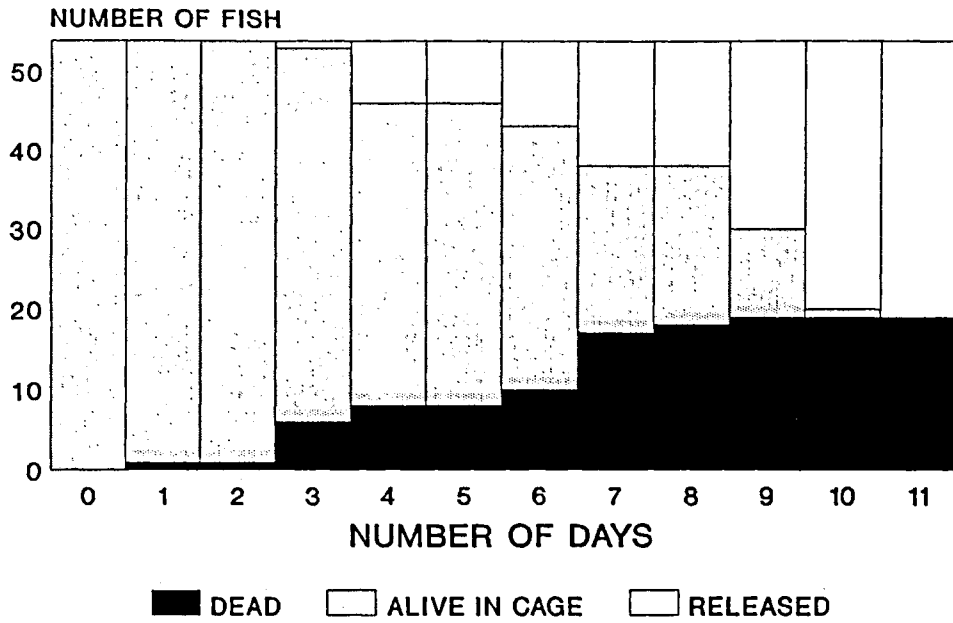


Figure 3. Survival and death of caged salmon.

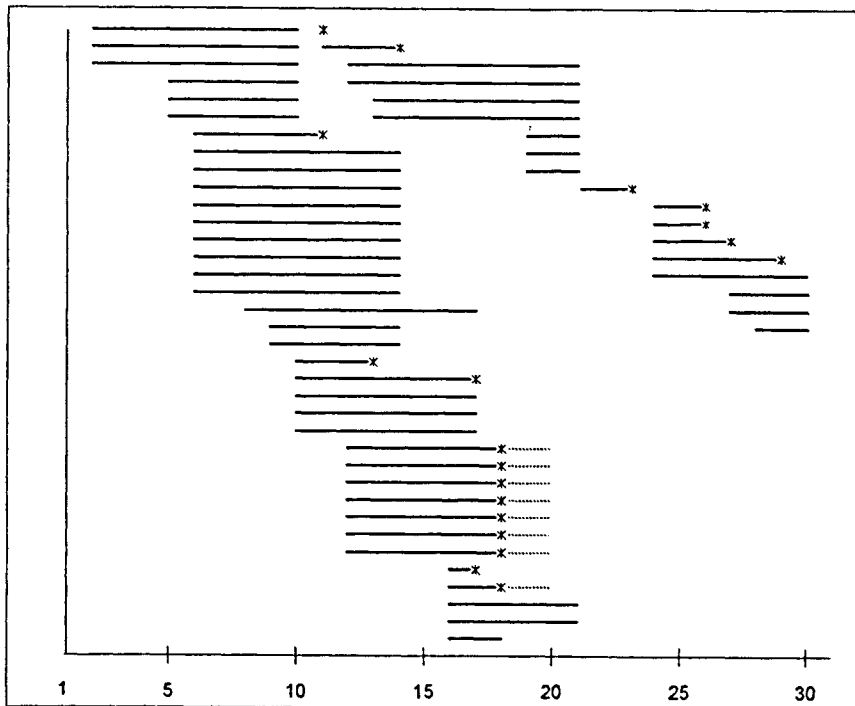


Figure 4. Caging, survival and death of undersized salmon in July 1992. Each line represents a caged salmon. The fish were released unless they died which is marked with an x.

usually swim behind the spawning adults. They are thus caught undersized. It is possible that there are also young salmon on their feeding migration (Kallio-Nyberg and Ikonen 1992) that are caught too young and undersized. If the majority of the discarded salmon are premature males and if prematuring is a hereditary predisposition, it is debatable, whether it is genetically wise to release them at all.

4. References

Fishery regulation 1993. 179/93, 12.2.1993 (in Finnish)

Kallio-Nyberg, I. and Ikonen, E. 1992. Migration pattern of two salmon stocks in the Baltic Sea. ICES J. mar. Sci., 49: 191-198.