



Freshwater Fishes of Atlantic Canada

Maritime College of Forest Technology
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Lab - Reading a Salmon Scale.doc

PART A - Read the background information

PART B - Label sections with given diagram

[MUST BE PASSED IN TOMORROW]

PART C - Age determination on two given scales

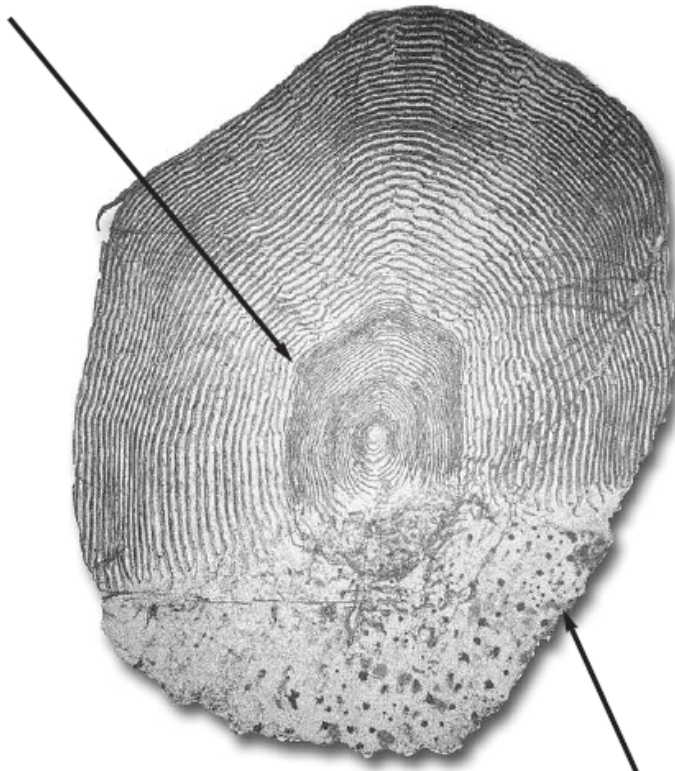
[TRY TODAY IN THE LAB]

READING A SALMON SCALE

Have You Read Any Good Salmon Lately?

The scales of a fish are like a book; they tell a story. Information about how old a fish is, where it has lived, and if it has been eating well can be gathered from its scale.

left for ocean as 2 year old smolt



Returned from ocean as a grilse (1 year at sea).

In figure __, the rings that form around the centre or core of each scale represents stages in either fresh or saltwater. The most widespread method of aging salmon parr and adults involves collecting scales. When clean and undamaged, scales show progressive growth rings similar to the rings on a tree. As the salmon grows, new growth rings are laid down in the scale as it gets bigger. The scales with their growth rings can be magnified in order to accurately reveal the life history of an individual salmon.

During the growth of salmon, ridges (or rings) are formed around the centre of the scale (also known as the focus or nucleus). It has been determined that these rings are found in proportion to the growth of the fish.

It is from these groupings that we can analyze the growth rates and ages of salmon. The wide-spaced rings are summer growth, while narrowly-spaced rings are winter growth. While growth is usually determined by temperature and amount of food intake, these terms indicate increased food and growth in summer periods and a decrease in growth during winter when temperatures are colder and food is less abundant.

Does Scale Sampling Harm the Salmon?

An advantage of scale sampling is that scales can be removed without harming the fish. Scale samples are regularly collected from the brood stock of an enhancement project and from fish collected during stream surveys and recreational fishery surveys.



Salmon scales

The examination of an adult salmon scale reveals 2 distinct parts which can be defined as:

- 1. River life:** the period spent in freshwater up to last river annulus. Salmon parr populations in different areas experience a very wide range of environmental conditions and thus exhibit large differences in patterns and rates of growth. The mean age at which salmon smoltify, therefore, varies from between 1 and 2 years in some southern populations in Europe and North America to 7 years in Labrador and northern Norway.
- 2. Sea life:** the period from the onset of sea growth; it may include time spent in freshwater as an adult.



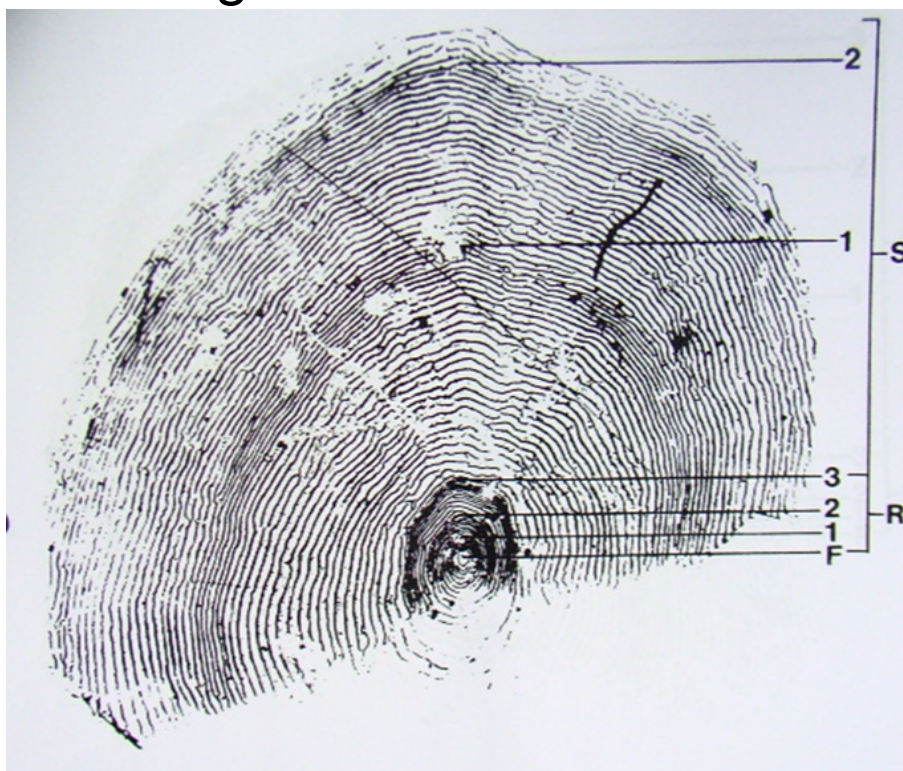
An Atlantic salmon's scales tell the story of its life - and even its ancestry and place of birth.

Growth rings on the scales tell the story of the salmon's growth, when it moved to salt water, and its return to fresh water after time at sea. The scales can tell us how many times the salmon has spawned, and can indicate the age.

Even growth rings can be an indication of Atlantic salmon raised in captivity, and whether the fish is an escaped farm-raised aquaculture salmon.

DNA, that can be extracted from the scales, can determine the relationship of that particular salmon to other groups of salmon, and ultimately can tell us from which stream, and even which section of stream the salmon came.

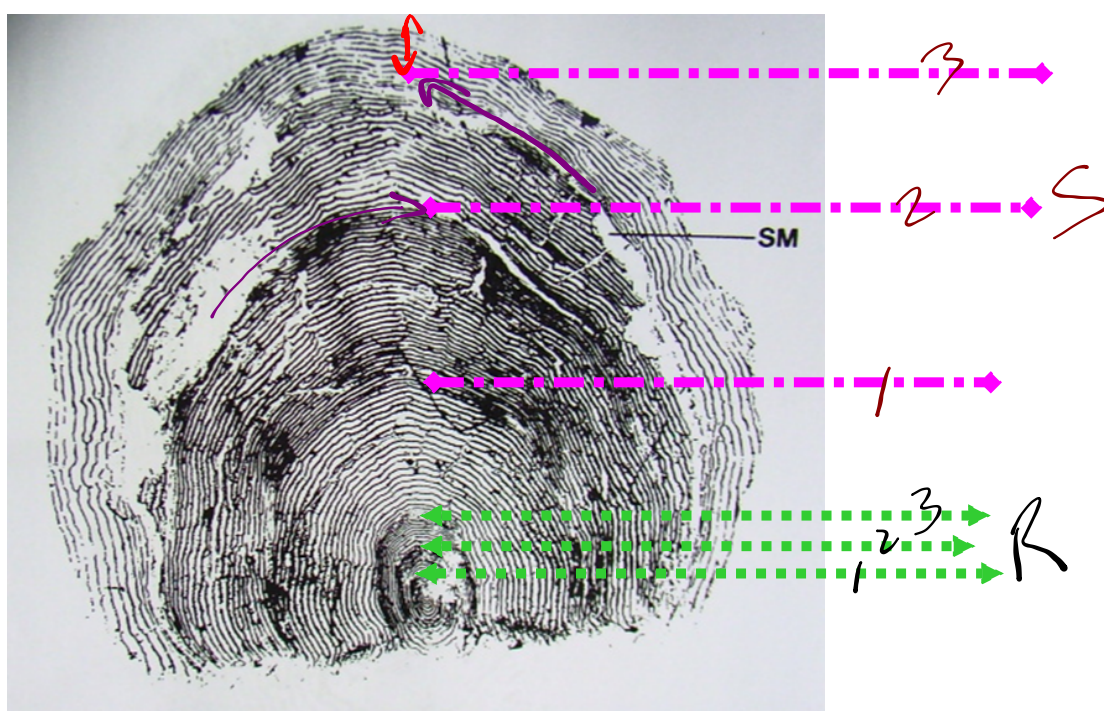
EXAMPLE: Age 3.2 +

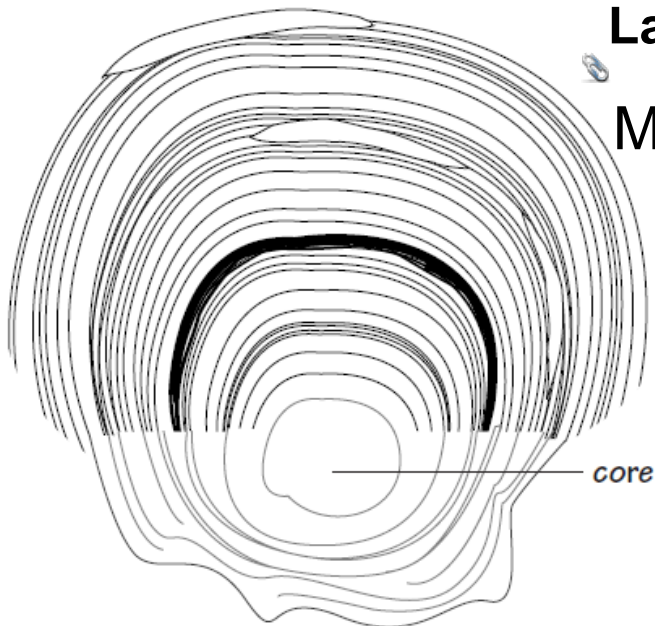


EXAMPLE: Age 3.3+



EXAMPLE: Age 3.3+ with a Spawning Mark





Lab - Label The Scale.pdf

MUST BE PASSED IN!

The scales of a fish are like a book. They tell a story. They tell how old the fish is, where it has lived and if it has been eating well. Now scales can be used as a source of DNA to find out how closely individual Atlantic salmon are related, and even whether they are from the same stream or not.

Find the **core** or centre of the scale (it's not in the middle!). This has been labeled on the diagram. The first rings form when the fish is in its early stages. If the water is warm and there's lots of food, the fish will grow well. The rings will be spaced far apart. This is summer growth. Label this section of the scale.

Next are some **rings** that are very close together. These grow during the fish's first winter. The water is cold and there's little food. The fish doesn't grow very much and the rings are close together. This is winter growth. Label this section on the diagram. At this stage, the fish was a year old.

The fish then spends another year in freshwater. Can you find the summer and winter growth rings for the second year? Label these sections second summer and second winter.

Following the second winter, the fish feeds heavily and then starts its journey to sea. At this stage it is called a smolt. It goes through some major changes and the scales show a dark band. Find the smolt mark and label it.

The fish then spends its first summer at sea. There is lots of food and it eats and grows well. The growth rings are far apart. Can you find these? Label their first summer at sea.

This is followed by a winter at sea when the fish is not eating well and the rings are closer together. Find these rings and label them first winter at sea.

The fish then returns to freshwater to spawn. During this time it doesn't feed and the scales develop special marks or scars. They look like blank spots on the scale. Label these spawning scars.

The fish spends the winter in freshwater and then returns to sea the next spring. After another summer and winter at sea, it comes back to freshwater to spawn again. Label second summer at sea, second winter at sea, and second spawning scars.

Attachments

Freshwater Fishes of Atlantic Canada.ppt

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