Plastination of Sturgeons with the S10 Technique in Iran: the First Trials

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Abstract

Ten sturgeons from three species *(Huso huso; Acipenser persious and Acipenser stellatus)* were plastinated according to the standard S10 technique. They were primarily fixed in 5% formaline. After dehydration by the freeze-substitution method, they were submerged in silicone for 24 hours and forced impregnated at -25°C for four weeks. They were finally pre-cured in an oven at 40°C for two days and cured with S6. The plastinated fishes are perfectly preserved.

Introduction

Sturgeon, also called caviar fish, are one of the most important fish in the world because of the great value of its eggs (caviar), and its skin which is largely used in leather industry to produce high quality bags. Because of unregulated fishing and excessive captures, this precious representative of the chondros fish group is now in danger of disappearing (Vlasenko, 1994; Pourkazemi, 1997) from its most important habitat in the Caspian sea (named Khazar in Persian) located north of Iran.

In this paper, the complete procedure, carried out in the department of anatomy of Iran University of Medical Science, to plastinate sturgeons will be stated.

Materials and Methods

Ten fresh sturgeons (weight 350-3000g) were obtained from the Rasht International Sturgeon Research Institute and plastinated according to the standard S10 technique (von Hagens, 1985).

Fixation

Fresh fish were fixed, by injection and immersion, in 5% formaldehyde for eight weeks at room temperature. A probe was inserted in the gills for better diffusion of the fixative solution in their bodies. They were then rinsed in cold tap water over night, in order to remove the excess formaldehyde, and cooled to 5°C before being dehydrated.

Dehydration

The specimens were dehydrated by the freeze substitution method (von Hagens, 1985; von Hagens et al., 1987). They were submerged in the first bath of 92% acetone at -25°C for ten days. They were then transfered in a second bath of 97% acetone at -25°C for another ten days. The fish were finally submerged in the third bath with 100% pure acetone at -25°C for ten more days. For each acetone bath, the purity of the acetone was monitored with an acetonometer at 20°C. The acetone purity after the third bath was over 99.5%. Dehydration was then considered complete.

Immersion

The fish were immersed in a mixture of S10/S3 (100:1) for 24 hours at -25°C. Vacuum was applied to the polymer mixture 24 hours before the immersion of the specimens.

Forced Impregnation

In the large fish, small incisions (1 cm) were performed

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under the trunks to permit better penetration of the polymer. Specimens were placed under vacuum condition for four weeks, at -25°C. The pressure was slowly decreased down to 5mm of Hg. Slow decrease of pressure (Table 1) helped to prevent the shrinkage of the specimens. The acetone bubbles coming up on top of the silicone mixture were carefully monitored for adjustment of the vacuum.

At the end of this stage, the vacuum pump was switched off. During the next 24 hours, pressure was slowly increased to the atmospheric pressure and the specimens, still immersed in polymer, were placed at normal room temperature for another day.

Table 1. Impregnation schedule.

PRESSURE	PERIOD OF TIME
85mmHg	1 day
75mmHg	2 days
62mmHg	3 days
5O mmHg	4 days
40mmHg	2 days
3O mmHg	3 days
20mrnHg	2 days
lOmmHg	1 day
7mmHg	1 day
5 mmHg	7- 10 days

Curing

The slow curing method was used for polymerization.

Procuring

After forced impregnation, the specimens were removed from the S10/S3 and placed on a grid to drain the excess polymer from their surfaces. They were then placed in an oven at 40°C for two days.

Gas Curing

The specimens were placed on a grid and exposed to S6 (gas cure) vapors for 3 days at normal room temperature. A small circulatory pump was used to bubble air through the S6 which accelerated the curing of the specimens surfaces.

Results

Perfectly preserved sturgeons (figures 1 and 2) were obtained with the standard S10 plastination technique. No noticeable shrinkage was observed on any of the specimens. Compared with other techniques, such as taxidermy, plastination provided better specimens. They seem more natural, are more flexible and can be easily carried and manipulated by the students with less risk of being damaged. They can be preserved while retaining all of their internal structures, even the viscera. They can also be partially dissected to show internal structures for anatomical studies. The size of specimens to be plastinated can be adapted to the dimensions of the impregnation bath chamber.

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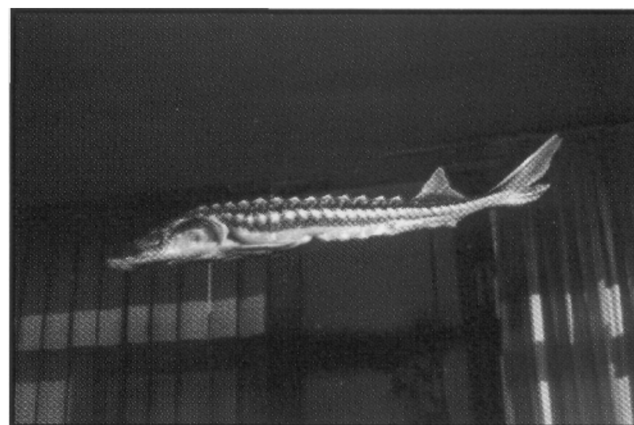

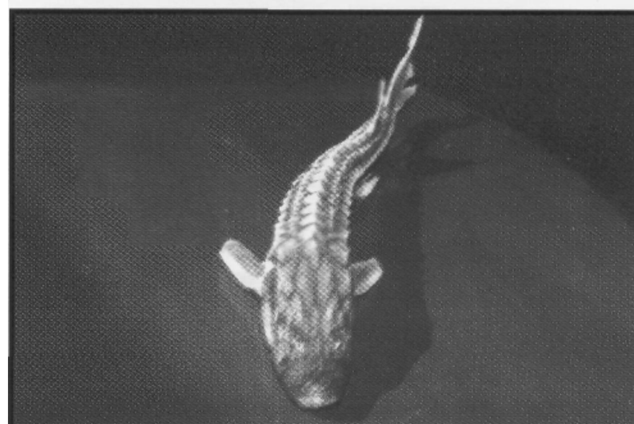

Figures 1 and 2. 39 cm (top) and 34 cm (bottom) sturgeons plastinated showing details of external surfaces.