

The former occurrence of sturgeon in the North Sea – The contribution of archaeozoology and ancient DNA

Thieren Els¹, Wim Van Neer^{1,2}, Anton Ervynck⁴, Gregory Maes² and Filip Volckaert²

¹ Royal Belgian Institute of Natural Sciences, Vautierstraat 29, 1000 Brussels, Belgium
E-mail: els.thieren@naturalsciences.be

³ Laboratory of Animal Diversity and Systematics, KU Leuven, Charles Deberiotstraat 32, B-3000 Leuven, Belgium

⁴ Flanders Heritage, Koning Albert II-laan 19, PO Box 5, B-1210 Brussels, Belgium

Sturgeon was once widespread across Europe and occurred in all major European rivers. Today, this fish is extinct in most Western European countries, including the Low Countries and the UK. It was traditionally assumed that this extinct sturgeon species was the European sturgeon (*Acipenser sturio* Linnaeus 1758), since no other sturgeon species were believed to have ever occurred in Western Europe. However, recent archaeozoological and molecular research on modern museum specimens and sturgeon bones from archaeological sites, has indicated that, in the past, also the American Atlantic sturgeon (*Acipenser oxyrinchus* Mitchill 1815) occurred in several large river basins in France (Desse-Berset, 2009, 2011), Germany and Poland (Ludwig *et al.*, 2002, 2009). This project aims at determining which sturgeon species historically occurred in the North Sea, more specifically in Belgium, the Netherlands and the United Kingdom. To this end, we are currently performing a combined morphological and genetic analysis on sturgeon remains from archaeological excavations in Belgium, the UK and the Netherlands, as well as on modern museum specimens.

The morphological research aims at validating the criteria to distinguish *A. sturio* from *A. oxyrinchus* by the surface morphology of their scutes, formerly described by Magnin (1964) and applied by several other authors (Ludwig *et al.*, 2002; Desse-Berset, 2009). Regarding the surface ornamentation of the scutes, the possible effects of the position of the scute on the body or size of the animal on the surface ornamentation of the scutes have never been verified. Therefore, sturgeon specimens in different European and North American museums are examined. Once valid criteria to distinguish the two species based upon isolated scutes are defined, species identification and size reconstruction will be done for archaeological sturgeon scutes.

In a next step, the results of the morphological study on the archaeological material will be validated by means of mitochondrial DNA analysis on a selection of the archaeological specimens using ancient DNA techniques (paleogenetics). As hybridization could have occurred between both species (Tiedemann *et al.*, 2007), nuclear DNA will also be analyzed to evaluate such possible scenario.

References

- Desse-Berset N. 2009. First archaeozoological identification of Atlantic sturgeon (*Acipenser oxyrinchus* Mitchill 1815) in France. *Comptes Rendus Palevol* 8(8):717-724.
- Desse-Berset N. 2011. Ancient sturgeon populations in France through archaeozoological remains, from prehistoric time until the eighteenth century. p.91-116. In: Williot P., E. Rocard, N. Desse-Berset, F. Kirschbaum and J. Gessner (Eds). *Biology and Conservation of the European Sturgeon Acipenser sturio* L. 1758. The Reunion of the European and Atlantic Sturgeons. Berlin Heidelberg. Springer Verlag.
- Ludwig A., L. Debus, D. Lieckfeldt, I. Wirgin, N. Benecke, I. Jenneckens, P. Williot, J.R. Waldman and C. Pitra. 2002. Fish populations: When the American sea sturgeon swam east. *Nature* 419(6906):447-448.
- Ludwig A., D. Makowiecki and N. Benecke. 2009. Further evidence of trans-Atlantic colonization of Western Europe by American Atlantic sturgeons. *Archaeofauna* 18:185-192.
- Magnin E. 1964. Validité d'une distinction spécifique entre les deux acipenséridés: *Acipenser sturio* L. d'Europe et *Acipenser oxyrinchus* d'Amérique du Nord. *Le Naturaliste Canadien* XCI(1):5-20.
- Tiedemann R., K. Moll, K. Paulus, M. Scheer, P. Williot, R. Bartel, J. Gessner and F. Kirschbaum. 2007. Atlantic sturgeons (*Acipenser sturio*, *Acipenser oxyrinchus*): American females successful in Europe. *Naturwissenschaften* 94(3):213-217.