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The Siberian sturgeon (*Acipenser baerii*, Brandt, 1869). Volume 1 – Biology

Patrick Williot, Guy Nonnotte, Denise Vizziano-Cantonnet, Mikhail Chebanov
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According to the preface of Philippe Ferlin, who else than Patrick Williot could have been the editor in chief, not only of one book on Siberian sturgeon (*Acipenser baerii*, Brandt, 1869), but two books: the first volume on biology, and the second one on farming. Patrick Williot has indeed devoted his entire career to sturgeons, mainly Siberian sturgeon and European sturgeon (*Acipenser sturio*). The information, including unpublished data, provided in this first volume is very impressive, making probably *A. baeri* one of the best known species in aquaculture. About forty authors from nine countries contributed, which demonstrates both the strength and diversity of the consortium and how Siberian sturgeon has attracted the interest of numerous scholars in the past decades.

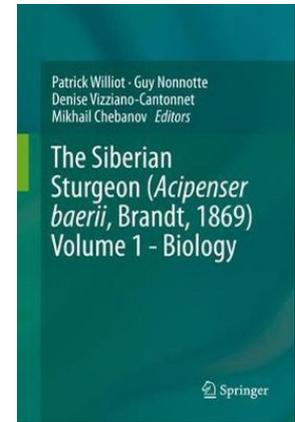
This first volume is dedicated to the biology of Siberian sturgeon and includes 25 chapters grouped into three main parts: biology and ecology (chapters 1-12), biology and physiology of reproduction (chapters 13-17), and ecophysiology: adaptation to environment (chapters 18-23), plus an additional one on methods (chapters 24-25). The first chapter provides an impressive overview of the knowledge acquired since the early 1960s, mainly by Russian colleagues, within the natural range of this species (Siberia). This is followed by a shorter chapter aiming at highlighting the adaptive features of this species compared to phylogenetically closed Ponto-Caspian sturgeons (chapter 2). An anatomic description focusing on peculiarities of this species, which is particularly manifested in the structure of digestive, hemopoietic, excretory, and reproductive systems constitutes the third chapter. An in-depth synthesis of the development, structure and mineralization of the axial skeleton is provided, which could help in understanding anomalies (lordosis, scoliosis) that lead to death in farms (chapter 4). Because sturgeon aquaculture is largely based around females due to caviar production, and no sexual dimorphism and differentiated gonads are present in juveniles, a better understanding of the sex determination and differentiation and the development of effective methods to identify sex, could reduce costs by excluding males as soon as possible (chapters 5, 6). An analysis of the transposable elements (TEs) expressed in the gonads concluded that sturgeon genomes contain many families of TEs, which might have contributed to the evolution of this divergent fish lineage (chapter 7). Two chapters are dedicated to early life stages (chapters 8, 9). Chapter 8 provides a holistic description of them, from fertilization to juvenile stages, based on morphological and allometric traits, which is completed with a histological description of the digestive system and olfactory and visual systems. Chapter 9 focuses on their behaviour, which is assessed under biology/ecology approach and hatchery conditions. An in-depth description of olfaction and gustation (chapter 10), nutritional requirements (chapter 11), swimming characteristics (chapter 12) conclude the first part of the book.

The second part of the book starts with a description of the neuroanatomy of the preoptic-hypothalamo-hypophyseal system located at the base of the brain and summarizes available data on the distribution of several hypophysiotropic factors (chapter 13). Based on an updated version of histological and ultrastructural studies, the chapter 14 provides a classification of oogenesis, which includes five stages. The main characteristics of spermatozoa and sperm are described in chapter 15, which notably highlights that sturgeons produce high volume of semen with relatively low sperm and protein concentration. Gonadal steroids involved in puberty and reproductive cycle of both males and females are then described, including the roles of aromatase, oestradiol-17 β , testosterone, and 11-ketotestosterone (chapter 16). By setting up a cannulation on farmed females, the steroid profiles were studied throughout the hormonal stimulations of spawning (chapter 17).

The third part includes the description of the results of a series of experiments (chapters 18-22) and a brief review of the toxicity of nitrites (chapter 23). The first experiment showed an increase in plasma concentration of catecholamines and cortisol along with changes in acid-base status when dissolved oxygen levels are low (chapter 18). The four following chapters, focusing on the various effects of high concentrations of ammonia in water on sturgeons, allow to (i) determine the sublethal and lethal levels (chapter 19), (ii) study the consequences on the gills epithelium and on the haematological features of blood (chapter 20), the acid-base balance (chapter 21), and plasma, brain and muscle concentration of amino acids and adeny nucleotides (chapter 22). A review of nitrite toxicity and the effects on fish as well as the recovery of animals exposed to acute episode of nitrite intoxication concludes this third part (chapter 23).

The book ends with two chapters which aims at describing (i) how to equip a sturgeon with an intra-aortic cannula (chapter 23), and (ii) a methodological approach to manage the water acid-base system as well as different methods used to determine the extracellular acid-base balance in fish (chapter 24). The six pages of conclusions written by three of the four editors assess the contents of this first volume.

This first volume represents a remarkable synthesis that will be useful not only for those working on this species but also more generally for all scientists interested in aquaculture and fish biology in its broadest sense.



Fabrice TELETCHÉA