

# UNISEXUAL REPRODUCTION IN FISH; ITS POSSIBLE BENEFITS FOR AQUACULTURE ON THE EXAMPLE OF SILVER PRUSSIAN CARP (*CARASSIUS 'GIBELIO'*)

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## Summary, keywords

*Silver Prussian carp (Carassius 'gibelio') is natural gynogenetic fish, which can combine two types of reproduction unisexual gynogenesis and normal sex reproduction. This attribute makes from this fish great model for study of unisexuality and chromosomal manipulation. It is also possible to employ this attribute for aquaculture purposes*

*Silver Prussian carp, Carassius 'gibelio', gynogenesis, aquaculture*

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## Introduction

Aquaculture is one of the most fast growing areas of food production in the world. Its growth has increased up to 10 percent per year since 1990. (FAO 2000). High number of the species, which could be potentially used in aquaculture, in addition to significant genetic plasticity of fishes give us opportunity for fast development of their selection and breeding. In my contribution I would like to present possible applications of knowledge of unisexual vertebrates in aquaculture.

## Results - discussion

There has been an explosive growth of research and application of chromosome manipulation techniques in the last 20 years. The most popular method of chromosome manipulation is the production of fish with extra set(s) of chromosomes, i.e. polyploidy. Other commonly used methods are meiotic and mitotic gynogenesis and androgenesis as well as sex chromosome manipulation. (Hulata, 2001; Arai, 2001)

Unisexual vertebrates are exceptional organisms and widely recognized as models in evolutionary biology (Vrijenhoek, 1994). All known unisexual vertebrates are probably hybrids and frequently associated with genome polyploidy (Quattro *et al.*, 1991; Vrijenhoek, 1994)

Silver Prussian carp (*Carassius 'gibelio'*) is a diploid-polyploid hybrid complex, which can reproduce by natural gynogenesis. Female fish requires sperm of the same or other species to activate egg development (Peňáz *et al.* 1979). In the population occurs small and variable proportion of males (Lusk *et al.*, 1998; Sczerbowski, 2002). If the sperm of the male of silver Prussian carp fertilizes the eggs of the female of the same species the recombination occurs in the offspring but when the eggs are "fertilized" by the sperm from the other species the offspring is developed by gynogenesis (Zhou *et al.*, 2000). It means that the offspring is a clone of the mother.

Individual clones have different characteristics as are growth rate, feed conversion, body type and others (Zou *et al.*, 2001). They may differ even in number of chromosomes (Zhou *et al.* in litt, Kalous unpubl).

This phenomenon of natural combination of two types of reproduction gives us an opportunity of creating new specific clones by selection and crossing of present natural clones and their maintaining by the usage of gynogenetic reproduction.

Studies of the unique mechanism of reproduction of silver Prussian carp may further find application in other aquaculture fish species.

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*Acknowledgments: the following grants: GA ČR 206/00/0668, GA CZU 10/360/00*