The Prussian carp *Carassius gibelio* was probably introduced to Europe from Asia. It has rapidly spread and is now one of the most widespread freshwater invasive species. It is also the most abundant alien fish species in the Polish ichthyofauna, inhabiting almost all available aquatic environments; in lakes, reservoirs of various types, breeding ponds, lower river parts, and even coastal brackish waters. The acquisition of new habitats provides him some interesting adaptations such as: a) the possibility of living in very different habitats, b) exceptional resistance to changing and adverse environmental conditions, c) the ability to create viable hybrids by crossing with related species, d) occurrence in the diploid and polyploid forms and the associated possibility of reproduction in two ways. Polyploids are organisms that have at least one additional single set of chromosomes in their body cells. Polyploidization has played an important role in the evolution of many fish taxa, including *Carassius* species, which are polyploid species. For this reason they are often used as model studies of evolutionary processes. Initially, the majority of European Prussian carp populations was unisexual and consisted of triploid (3n) females. These females reproduce gynogenetically; the genome of the mother is clonally transmitted to female progeny. There is no fertilization, but the female eggs must be stimulated to develop by the sperm of male; in unisexual populations using sperm of the related species. In recent years, the presence of males in various numbers has been observed in the Prussian carp populations and it is reported specific and interesting phenomenon of 'transformation' of the European female gynogenetic populations into bisexual-gynogenetic populations which is associated with the possibility of bisexual as well as gynogenetic reproduction. The processes accompanying the changes in the structure of the sex and ploidy in these populations have not yet been elucidated. Very few data are available on morphology and histology of the gonads and hormonal regulation of the reproduction of the Prussian carp, which would involve individuals of different sexes and ploidy. The project concerns the Prussian carp with such a population, which was previously known in terms of the structure of sex and ploidy by the authors of the project.

The purpose of the project is to determine the reproductive potential of diploid and triploid females and males of the Prussian carp *C. gibelio* from the bisexual-gynogenetic population in comparative studies of the structure and function of their gonads (morphology and histology of gonads, size of the oocytes and eggs, fertility, the concentration of steroid hormones, androgen receptor gene expression).

The studies do not required catching fish because they will be made on previously collected tissue. The proposed research material is special because it gives the opportunity to compare the results of the structure and function of gonads of different sex and ploidy individuals co-existing in one population. The proposed for the first time studies of the Prussian carp combine knowledge of the gonad morphology and structure with the control of the reproductive functions at the hormonal level and the activity of the appropriate gene. The results obtained will provide an assessment of the impact of ploidy on the reproductive potential of this species and they join to a relatively small number of similar data on natural polyploids. The result of this research will be an extension of the knowledge of the biology of the Prussian carp, a species quite unique among fish and vertebrates, which can ‘choose’ the way of reproduction. The appearance of the bisexual-gynogenetic population of the Prussian carp may be the result of the warming of the climate, degradation of the aquatic environment, perhaps favouring the extraordinary adaptability of the Prussian carp, or it is a part of the process of natural evolution of this invasive species. The obtained results will significantly contribute to understanding the mechanisms of the functioning of the natural diploid-polyploid populations the Prussian carp and their transformation.