

## **Educational-Research Youth Expeditions On Small Rivers**

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### Abstract

Ecological situation around reservoirs and small rivers is one of the most actual problems in Ukraine. Small rivers having small flow volume is more liable to contamination dominance, then large ones. Anthropogenic influence of many years leads to changes in ecology of valleys, hydrological routine, physical and chemical descriptions of water and ground sediments, hydrobiont association composition. The educational-research expeditions on small rivers take place under the leading of experienced scientists-ecologists and lecturers with students participation. They serve as example of problem, complex and object approach in ecological education. Small river ecosystem presents multicomponent aqua-territorial complex of natural conditions (climate, relief, hydrology, vegetation and animal peace, hydrochemistry) and has a complex problem on anthropogenic transformation. Thanks to small extent area the study of river environment is available to small groups. An expedition project includes a preliminary course on ecology basis and methods of scientific material selection, information search, walking of itinerary, samples selection for processing and analysis. Our expedition on the Oril river (Central Ukraine) resulted in studied species variety of water flora, a row of displayed thin and vanishing plants. However the transformation signs of specific hydrobiocenosis composition were marked following hydroconstructions and agricultural activity. The Oril river's natural complexes preserving considerable biological variety, but affected by anthropogenic dominance, need to be guarded. Expedition materials were included into proposals on of the National steaming foundation with territory overcoming the Oril's valley in the middle flow within bounds of three regions in Central Ukraine.

### Introduction

Ecological education of youth acquires the more and more important significance at present. The both acquaintance of pupils with up-to-day ecological problems and ecological thought forming become obliged attributes of secondary and highest education. But ecological education has only good efficiency when the pupils take themselves part in the study of those problems.

Ecological situation around reservoirs and in particular small rivers is one of the most actual problems in Ukraine. Many years' anthropogenic impacts upon small rivers led to changes in environment of valleys, hydrological relationships, physical and chemical descriptions of water and ground sediments, hydrobiont association composition. That is aggravated with present anthropogenic pressing. Small rivers having small flow volume are more liable to contamination dominance then large ones.

The educational-research expeditions on small rivers take place under the leading of experienced scientists-ecologists and lecturers with participation of students and pupils. These expeditions serve as example of problem, complex and object approach into ecological education.

Small river ecosystem presents multicomponent aqua-territorial complex of natural conditions (climate, relief, hydrology, vegetation and animal world, hydrochemistry) and has a complex problem on anthropogenic transformation. Thanks to small extent area the study of river environment is available to small groups.

Of course, only specialists related may carry out such complex investigation. It is completely possible at the cooperation of various organizations and foundations: scientific, educational, non-governmental, municipal, etc. In that case an expedition uses their joint funds and materials for the aims of science, education and environment protection. The specialists from Dniepropetrovsk National University, Junior Science Academy have a significant experience in organization of educational-research expeditions at the cooperation of various foundations and establishments.

Scientists of Dniepropetrovsk National University are engaged with environmental study of small rivers and their valleys in steppe and forest-steppe zone of Ukraine from 30<sup>th</sup> years. At present, having a large experience of research and pedagogical activity scientists of Dniepropetrovsk National University collaborate with educational establishments of various levels and profiles in the ecological fields. The main forms of that collaboration are educational-research expeditions on small rivers with direct participation of secondary school pupils, students of the Junior Science Academy and students of the Biology and Ecology Faculty of Dniepropetrovsk National University.

An expedition project included usually a preliminary course on ecology basis and methods of scientific material selection, information research, walking of itinerary, samples selection for future processing and analysis at the basis of Dniepropetrovsk National University.

The results of expeditional work with recommendations on improvement to optimal environmental situation near small rivers are reflected into scientific reports, video films, mass-media publications. Materials on the expedition researches are published at scientific and public issues; reports are submitted to the regional branches of Ministry of Ecology and Environmental Resources of Ukraine.

#### Results of expedition on the Oril river

The expedition on the Oril river was organized by scientists of Dniepropetrovsk National University with specialists of the Regional Ecology Environmental Center (Dniepropetrovsk).

The Oril river (Central Ukraine) by its physical-geographical conditions is one of less transformed river with industrial contamination thanking to its distant position from large industrial cities. Although the Oril is situated in wellknown region, it is one of the less investigated reservoirs in Ukraine. The Oril basin is located in forest-steppe (medial part of the river-bed) and steppe zones of Ukraine. The river flows in territory of Prydniprovsk Lowland, which is composed with strong lays of sediment

rocks, because the river valley is good occupied with surface water. The Oril basin has developed hydrographic net. In lower flow of the Oril there are maintained small forest massifs, but they are strongly transformed with economical activity of human. Lower part of the river basin is non-ordinary wide with numerous lakes and swamps. That all creates a variety of physical-geographical conditions.

Vegetation in higher part of the Oril basin is traditional for small rivers in Ukrainian Steppe and distributed by dispersal-spot and zonal types. Communities of club rush (*Scirpus*), glyceria reed (*Glyceria arundinacea*), sedge (*Carex*) were numerous. On sites of surfase washing of farm animal waste there were communities of both pondweed clasping-leaved and fennel-leaved kinds (*Potamogeton perfoliatus* and *P. pectinatus*), and association complexes of water-torch (*Typha latifolia*), bur reed (*Phragmites communis*), glyceria reed (*G. arundinacea*), fibrous-rooted sedge (*Carex communis*) in coastal zone. Here as well as in higher region vegetation is affected in result of unlimited farm animal grazing.

In medial part of the river basin vegetation is more various while deepness and wideness of river-bed become larger. At some sites it present complexes of associations with mosaic type of dispersion. Communities of clasping-leaved pondweed (*Potamogeton perfoliatus*) and pondgrass (*P. pectinatus*), flowering rush (*Butomus umbellatus*), water speedwell (*Veronica anagallis-aquatica*), water-bean (*Nuphar luteum*) were prevailing here. Sometimes the exceptional communities of white water lilies (*Nymphaea alba* and *N. candida* – Green Book of Ukraine) and stonewort (*Chara*) were found there. In coastal zone it have been observed zonal vegetation dispersion composed with ribbon-like phytocenoses (phragmentary and solid) of air-aquatic plants, which were called before. Communities of bur reed (*Phragmites communis*), and mace reed (*Typha latifolia*) prevailed. The rare species of plant were found here: white water lilies (*Nymphaea alba* and *N. candida*), sea sedge (*Acorus calamus*).

Near artificial channels vegetation shows exceptionally zonal type of dispersion with simplified composition of plant association.

### Conclusion

Therefore, youth educational-research expedition on the Oril river (central Ukraine) resulted in studied variety of water and coastal vegetation, including a number of rare plant species. However the transformation signs in specific hydrobiocenose composition were marked following hydroconstructions and agricultural activity. The Oril river's natural complexes preserving considerable biological variety, but being affected by anthropogenic dominance, need to be guarded. The expedition materials were included into proposals on of the National steaming foundation with territory overcoming the Oril's valley in the middle flow within bounds of three regions in Central Ukraine.

Furthermore, joint complex environmental expeditions of educational and non-governmental organization assist to fulfillment of both task: improvement of ecological situation in small rivers' environment and forming ecological thought in youth.