S3.05. The use of *Daphnia magna* species in bio-remediation of freshwater ecosystems

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The pollution effect of wastewaters, leading to a reduction of bio-productivity and biodiversity of freshwater ecosystems is well known. In the Republic of Moldova, a large portion of wastewater is insufficiently treated due to mal-functionality of treatment plants, thus often untreated or poorly treated wastewaters are discharged into the water bodies. In rural localities as well as in district centres (rayons), treatment plants are completely missing or almost non-functional, most often wastewater being treated insufficiently, with only mechanical stage, but without biological treatment. As a result, there is an intensive pollution of water basins with nutrients, suspended substances, pathogenic microorganisms, pharmaceuticals and other pollutants, contributing to their eutrophication and continuous degradation. Bio-remediation by the use of aquatic organisms is of particular interest, because it is not expensive and can be based on organisms already existing in aquatic basins.

The application of inferior crustaceans in wastewater treatment is based upon the self-purification mechanism linked to trophic connections of organisms and the fact that in the natural aquatic ecosystems zooplankton organisms act as a natural biological filter. The filtration capacity of filtering zooplankton organisms is so intensive they can pass during a period of 24 hour an entire water volume of an eutrophic ecosystem through their filtering apparatus. *Daphnia magna* Straus, 1826 attracted the attention of researchers (Kampf et al. 2006 Shiny et al., 2005), owing to their biological filtration capacity and the reduction of the toxic effects of wastewater. Most

of the representatives of Cladocera are predominant in eutrophic water bodies in comparison to the copepods, due to their ability to feed under the conditions of dense suspensions. Owing to their ability to filter and feed on cleavage solids, nutrients, algae and micro-organisms, *D. magna* can serve as cost-effective and user-friendly biological filters, contributing to the bio-remediation of aquatic ecosystems and the restoration of bio-production, especially fish bio-production. *Daphnia* grown in wastewater ponds of Luxemburg, reached a consumption of phytoplankton of 66-92 % and that of bacterioplankton - 0,1 to 18 % of biomass during a period of 24 hours (Michucova 2007).

Experimental studies performed by Kampf et al. (2004), under mesocosms and semi-technical conditions have shown that *D. magna* can be effective in reducing coliform bacteria as well as in preventing the excessive development of algae. At a hydraulic wastewater retention time of over 12 hours, using a *D. magna* concentration of over 50 individuals, a reduction of the solid particles was achieved - 30% due to *Daphnia* filtration and 18% due to sedimentation (Serra & Colomer, 2016). At a density of 2000 specimens per litre, a reduction of 80% of suspended particles can be attained (Frook, 1974). *D. magna* also contributes to the inactivation of *E.coli* by 1.2 log units, which was 6 times more efficient than conventional macro-filtration (Serra et al., 2014). Another study (Michukova, 2008) indicated that *D. magna* contributes to a complete reduction of the number of coliforms in wastewater by predating on these bacteria. The culture of *D. magna* can be used in the treatment of wastewater from livestock farms (Alexandrov n.d. cited by Michucova, 2007). The given research demonstrated a high potential of use of polyculture of *D. magna*, microalgae and other crustacean in the treatment of wastewater from zootechnical farms. It is important to conduct research under laboratory and field conditions for assessment of the performance of treatment using such biological methods.

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