Effect of 17 α -ethynylestradiol and Norethindrone on Swimming and Reproduction of Cladoceran D*aphnia magna* STRAUS

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The ban on usage of a low dosage oral contraceptive, Pill, has been removed in many countries. The Pill is composed of 17 α -Ethynylestradiol (EE2) and Norethindrone (Nor), which are residual in water bodies because of their water-insolubility. However, effect of both the chemical compounds on organisms has scarcely been assessed. The present study evaluates the effects of the Pill on the reproduction and swimming of a freshwater cladoceran *Daphnia magna*, that is usually employed as a test animal and is a key species linking between phytoplankton and fishes. Acute toxicity test showed that 5 ppm of EE2, the highest concentration in the present study never inhibited swimming, whereas Nor inhibited swimming at > 3 ppm; 48h-EC_{50} was 4.98 ppm. Chronic toxicity tests were carried out for 25-days by measuring the total number of offspring, reproductive frequency, molting and sex ratio of neonates at 20, 100 and 500 ppb. Quantity of diet (green alga *Scenedesmus* sp.) was reduced so as to increase the occurrence frequency of male neonate during experiment. EE2 affected the reproduction; total number of offspring and reproduction frequency decreased significantly at > 100 ppb (to 70 – 80% of the control). However, no effect was observed in molting and sex ratios at < 500 ppb. Nor have no effect on reproduction and sex ratios at < 500 ppb. The mixture of EE2 and Nor (1 : 17 in weight ratio) lessen synergistically the reproductivity; the mixture decreased significantly the total number of offspring and reproductive frequency at > 100 ppb. Total number of offspring decreased to ca. 50% of the control.

The present results suggest that productivity of parthenogenic *Daphnia* can be damaged considerably by the Pill pollution, whereby function of pelagic ecosystem, e.g., grazing food chain will be paralyzed in the future.