EFFECT OF 17 β -ESTRADIOL ON MATING BEHAVIOR AND REPRODUCTIVITY OF MALE MEDAKA, *Oryzias latipes*

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Introduction

Since behavior is an intrinsic attribute in animal, observation of the behavioral changes of test animals may be one of the indexes that can be used to estimate the effects of environmental stimuli on animals[1]. The mating behavior of medaka (*Oryzias latipes*) such as following, courtship dance and crossing would be such type of typical behaviors. In this study, effects of estrogenic chemicals on mating behavior of male fish were investigated.

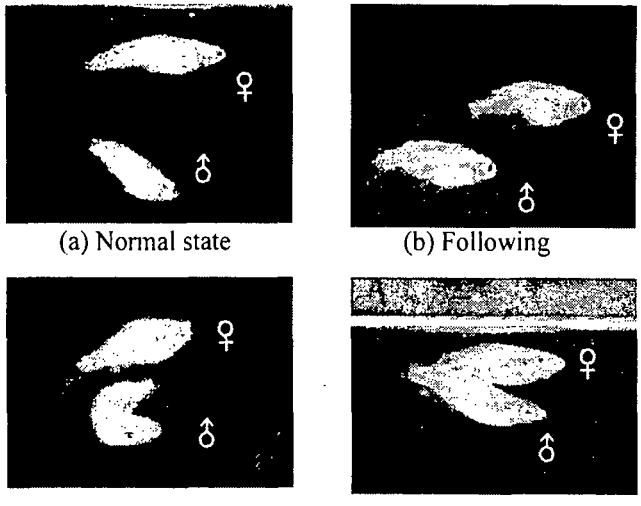
Methods and Materials

Male medaka were exposed to 17 β -estradiol at nominal concentrations of 2 and 20 μg/L for 14 days. After exposure of the chemical, mating behavior between two treated male medaka and three normal female which were injected with prostaglandin F2 α just before the test[2], was analyzed by using video camera for one hour in an aquarium [14(L)×12(W)×11(H)cm].
In addition, the number of eggs spawned and fertilization rate during 7-day mating period between five treated male and seven normal female after 14-day exposure period were assessed.

Results and Disscussion

Normal control male showed typical mating behavior(Fig. 1) such as following, courtship dance and crossing while 17 β -estradiol treated male did not show any typical mating behavior(Table 1).

Furthermore, fecundity and fertility were significantly decreased in the group treated with 17 β -estradiol at 20 μg/L (Fig. 2, Fig. 3). It was suggested that analysis of mating behavior could be a useful endpoint for the screening of the endocrine disruptors.



(a) Normal state (b) Following

(c) Courtship dance (d) Crossing

Fig. 1. Typical mating behavior in male toward the female. This mating behavior between normal medaka male and female was recorded by video camera for 1 hour.

Table 1. Effect of 17 β -estradiol on mating behavior in male medaka

	Control	17 β -Estradiol	
		2 μg/L	20 μg/L
Courtship dance	21	0	0
Crossing	5	0	0

Data is the total number of courtship dance and crossing of 2 male and 3 female in each treatment and control aquarium during 1-hour observation using video camera.

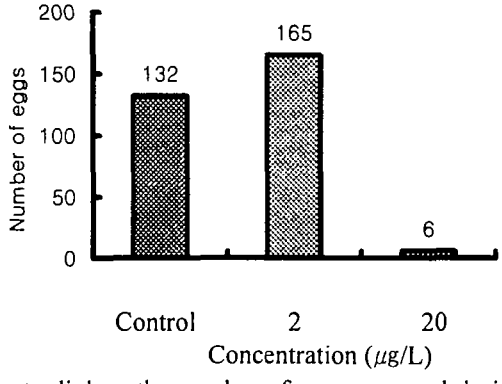


Fig. 2. Effect of 17 β -estradiol on the number of eggs spawned during 7-day mating period after 14-day exposure for male medaka.

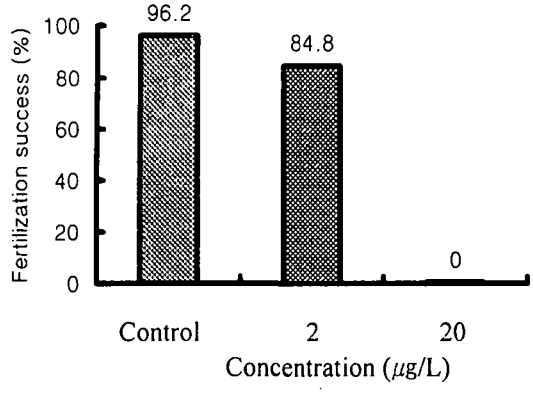


Fig. 3. Effect of 17β-estradiol on fertilization success during 7-day mating period after 14-day exposure for male medaka.

References

1. Ryu, J.S., Lee, C.W., Choi, P.S., Choi, S.S., Rhu, H.I., Chung, K.H., Lee, K.C. and Park, K.S. (1999), Behavioral toxicity of Cd-treated *Oryzias latipes* using computer-automated video tracking system, Kor. J. Environ. Toxicol., 14, 217-222.

2. Kobayashi, M. and Stacey, N. (1993), Prostaglandin-induced female spawning behavior in goldfish (*Carassius auratus*) appears independent of ovarian influence, Horm. Behav., 27, 38-55.

(Poster Presentation)