EFFECT OF PHOTOPERIOD ON GONADOTROPIN (FSHβ AND LHβ) REGULATION IN THE DAMSELFISH, CHROMIS NOTATA

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Introduction:
Photoperiodic signals were important factors in regulating rhythmic physiological and behavioural events in teleosts. It is not fully understood how fishes utilize environmental changes in order to exert reproductive activity. The purpose of the present study is to investigate the involvement of photoperiod in gonadal development of the damselfish, Chromis notata, inhabiting in Jeju, Korea.

Methods:
The fish were divided into three groups and reared under three different artificial photoperiod regimes [short day photoperiod (LD 10:12), long day photoperiod (LD 14:10), and control group (LD 12:12)] for 60 days at natural water temperatures (range from 19 °C to 26 °C). The gonadosomatic index (GSI) was calculated for each fish. Pieces of the gonads were stained with hematoxylin-eosin for light microscopic observation. The pituitaries were dissected out from the fish brain for analysis of FSHβ and LHβ mRNA expression by using a real-time quantitative RT-PCR.

Results:
The fish rearing under LD 14:10 resulted in a significant increase in the GSI and induction of vitellogenic oocytes or spermatogenesis, whereas the gonads of fish reared under LD 10:14 and LD 12:12 conditions were occupied by the immature oocytes or spermatogonium. Similar tendencies showed in expression changes of FSHβ and LHβ mRNA levels under different photoperiod regimes.

Conclusion:
The GSI and histological observation indicate that LD 14:10 induces advancement of gonadal development. Furthermore similar expression patterns of FSHβ and LHβ mRNA under same photoperiod condition could be explained as a photoperiodic effect on the hypothalamus-hypophysis-gonad axis for the initiation and termination of reproductive activity in certain fish in the temperate region.