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PS-5 Effect of photoperiod and temperature on the reproductive performance of a tropical damselfish *Chrysiptera cyanea* during different phases of reproductive season

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The sapphire devil *Chrysiptera cyanea* is a reef-associated damselfish having the reproductive season from April to August in Okinawa waters. It is still unclear how this species utilizes environmental factors in their reproductive performance. The present study was aimed to examine the effects of photoperiod and temperature on their reproductive activities. The reproductive season with different patterns in environmental factors was divided into three phases; phase-I (April to May; increases in water temperature and photoperiod), -II (June to July; increase in water temperature and peak of photoperiod), and -III (August to September; decreases in water temperature and photoperiod). When the fish were reared in each phase at constant temperatures of 20, 25 or 30°C, gonadosomatic index (GSI) was not different among the groups within 30 days during phase-I. Histological observation revealed that the ovaries at 20 and 25°C contained oocytes at vitellogenic stages, while those at 30°C had regressed oocytes at vitellogenesis. Post-ovulatory follicles were notable only in the ovaries at 25°C. Similar ovarian features were observed in phase II, although GSI at 30°C decreased significantly within 30 days as well as at 20°C within 45 days. In phase-III, the GSI of all the groups decreased and the ovaries at 30°C were exclusively occupied by immature oocytes. During phase I to III, active spawnings were repeated in the fish at 25°C, whereas no or few spawnings were observed in the fish reared at the other temperatures. In phase-III, the fish kept under long photoperiod (LD14:10), but not under short one (LD10:14), resulted in prevention of decrease in GSI and disappearance of vitellogenic oocytes in the ovaries. These results indicate that long photoperiod with a suitable range of water temperature act as a principal determinant in continuity of gonadal activity during reproductive season, while higher temperature has a negative impact on gonadal development. In addition, failure of the prolongation of reproductive activity by manipulation of these environmental factors may signify the existence of self-sustained circa-annual reproductive rhythm in this species.