

## Synchronization of Plasma Sexual Steroid Concentrations and Gonadal Cycles in the Sleeper, *Eleotris acanthopoma*

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**Hung-Yi Wang, Ching-Feng Weng, Ming-Chung Tu and Sin-Che Lee (2001)** Synchronization of plasma sexual steroid concentrations and gonadal cycles in the sleeper, *Eleotris acanthopoma*. *Zoological Studies* 40(1): 14-20. This paper describes the possible influences of environmental factors on the reproductive cycle of *Eleotris acanthopoma* in the Kaoping River estuary. For over 1 yr, gonad gross morphologies of the fish were examined by light microscopy, and plasma 17 beta-estradiol (E2) and testosterone (T) were analyzed by ELISA. In male *E. acanthopoma*, plasma T concentrations show a single seasonal cycle, with a peak in the summer (June to August) following the profile of the gonadosomatic index (GSI). In females, plasma E2 concentrations are significantly elevated during summer in accordance with the GSI. Low temperatures and a short photoperiod in the winter correlate well with the arrest of gonad maturation. Annual patterns of plasma E2 and T levels are similar to those of GSI changes existing in *E. acanthopoma* of either sex. These findings indicate that both temperature and photoperiod dominantly affect the reproductive cycle of *E. acanthopoma*.

**Key words:** Photoperiod, Temperature, Annual cycle, *Eleotris acanthopoma*, Estradiol (E2) and Testosterone (T).

Reproduction is an important factor ensuring the continuation of a species by recruitment of the next generation. Most fish employ external fertilization, and their embryos and larvae must be adapted for more or less unstable environments including variable salinities, temperatures, light, water currents, food supplies, and predation. Reproductive adaptations would be expected to occur during the breeding season to ensure the maximum survival of offspring. The number of surviving offspring depends to a large extent on the number of eggs laid, and this in turn is governed by fecundity and the number of mature females themselves. In order to understand reproductive biology, particularly the reproductive cycle of fish, studies on the timing and duration of breeding, the process of gonad maturation, the sex ratio, and fecundity must be included. The sex steroid levels in gonads and peripheral blood plasma are useful indicators of steroidogenic

secretion during a particular stage of the sexual cycle, and in association with changes in gonad condition, have fostered an understanding of the endocrine control of reproduction in teleosts. Determinations of steroid hormones and gonad condition during the annual reproductive cycles of various teleosts have been reported (Singh and Singh 1987, Matsuyama et al. 1991). Moreover, alterations of steroid hormones have implications in studying the effects of the environment (temperature, photoperiod, pollution, or habitat degradation) on the reproductive biology of fish (Bromage et al. 1982, Okuzawa et al. 1989, Shimizu et al. 1994).

Gobioids comprise a large group of marine, freshwater, or estuarine fishes; *Eleotris acanthopoma* of the Eleotrinae is one of the most abundant species in Taiwan, living mainly in estuaries of the west coast. Abundant nutrients in rivers have attracted this species to widespread habitats. The re-

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