

THE EFFECTS OF STOCKING METHOD ON THE GONAD DEVELOPMENT OF ANDROGEN TREATED FALSE CLOWNFISH, AMPHIPRION OCELLARIS

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Introduction:

The false clownfish (Amphiprion ocellaris) is the most commonly kept clownfish in aquaria. A. ocellaris is protandrous hemaphrodite, meaning that all individuals develop first into males and then possibly into females later in life with socially structured reproductive behavior [1]. The demand for A. ocellaris as ornamental fish has increased but due to deterioration of its natural habitat and the effects of over-fishing, their numbers have drastically decreased. To replenish its natural population, attempts are underway to raise this popular anemonefish in artificial conditions for mass production. One of the current methods for the mass production of clownfish is to directly produce male and female broodstock using hormone treatment. Among the reproductive steroids, 17α -methyltestosterone is the most commonly used androgen to masculinize fishes and it has been tested in more than 25 species [5]. Several methods of steroid administration are available but immersion and oral treatments are preferred due to their efficiency [2]. Therefore, this study was conducted to study the effect of stocking methods (pairing and nonpairing) on the hormone treated fish.

Methods:

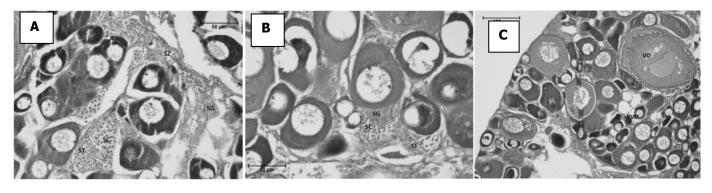
Twenty false clownfish juveniles (A. ocellaris) (3.5cm-5.5cm total length) were immersed in 1ppm of 17 α -methyltestosterone (MT) for 15 days and then kept for 2 months. At the end of the treatmant, 10 of them were separated into 10 different aquariums while the rest

were paired and put into 5 aquaria. Sampling was done twice, 1 and 2 months post hormone treatment for gonad histology where 3 fish and 2 pairs were taken from the first and second group, respectively.

Results and Discussion:

At the end of the 15-day hormone treatment, huge amount of testicular cells can be found inside the gonad of all treated fish. After 1 month post-exposure to 15 days of MT, the ovotestes from the non-paired fish (α) and the smaller from the paired fish (β) , possessed all stages of spermatogenesis. Meanwhile, the bigger fish from the pair (γ) have no testicular cells in its ovotestes (Figure 1). The ovotestes were consisting mainly of previtellogenic oocytes and some vitellogenic oocytes. After 2 months of rearing post-treatment, fish γ ovotestes possessed mostly developed ovarian cells. It becomes more aggressive and much bigger than their pair (fish β) which still has some testicular cells (Figure 2). It is the same with study done on A. ocellaris [4] and the sex changing A. melanopus [3]. This may suggest that when paired, the more aggressive and much bigger fish might change sex to female which is the same condition with A. ocellaris in wild. Meanwhile fish α still possessed some testicular tissue though the amount started to decrease. A study on A. bicinctus [6] shows that, the gonads of A. bicinctus, which are held alone, contained mainly growing ovarian tissues. The development and maturation of testicular cells without a female to mate with would be a waste of resources [3].

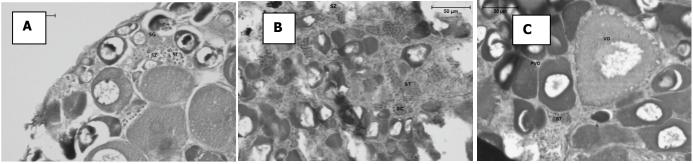
Figure 1: Gonadal cross section (40X10) of *A. ocellaris* juvenile 1 month post treatment with MT showing (A) gonad of (α) fish, (B) gonad of (β) fish and (C) gonad of (γ) fish. SG, spermatogonia; SC, spermatocytes; ST, spermatid, SZ, spermatozoa, PVO, pre-vitellogenic oocytes, VO, vitellogenic oocytes.



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Fig 2: Gonadal cross section (40X10) of *A. ocellaris* juvenile 2 month post treatment with MT showing (A) gonad of (α) fish, (B) gonad of (β) fish and (C) gonad of(γ) fish. SG, spermatogonia; SC, spermatocytes; ST spermatid, SZ, spermatozoa, PVO, pre-vitellogenic oocytes, VO, vitellogenic oocytes.



Conclusion:

Even though MT treated fish can change sex into male, but they still can change into female since the social structure influence their sex determination mechanism. It is also suggested that, in order to maximize the effect of masculinization on *A. ocellaris*, the fish should be paired directly with a matured female. By directly pairing them, it is expected that the treated fish will become an active matured male.

References:

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