Commentary

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Effects of Light Intensity on Juveniles of the Red Claw Crayfish Implications for Growth and Behavior

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Introduction

Study the effect of light intensity on red claw crayfish juveniles, experiments were carried out in this study. The results showed the following. (1) The 20 lux group had the highest survival rate. (2) The growth rates of the 20 lux, 200 lux and 0 lux groups were faster. (3) The juveniles in the 1000 lux and natural light groups were always clustered, while other groups were dispersed within 2–3 days. The 0 lux and 20 lux groups had higher dispersion. (4) Antioxidant capacities in the 0 lux and 20 lux groups were higher, and immune capacity in the 20 lux group was higher. (5) Monoamine contents were lower in the 0 lux and 20 lux groups. (6) α-AMY or EcR expression in the 20 lux or 0 lux group was higher. We concluded that (1) juveniles under 20 lux light intensity had higher survival and growth rates. (2) The dispersion of juveniles at 0 lux and 20 lux light intensity was higher. (3) The physiological metabolism and immune abilities of juveniles at 0 lux and 20 lux light intensity were higher. (4) 0 lux and 20 lux was helpful in inhibiting cannibalism. (5) A 20 lux light intensity was helpful to in the expression of α-AMY to improve digestion and absorption capacity. Low-intensity light enhanced the expression of EcR, which contributed to the moulting of juveniles. We considered in actual production, it could be necessary to control 20 lux light intensity during the intermediate cultivation period of juveniles.

Light plays a crucial role in the lives of aquatic organisms, influencing various physiological and behavioral processes. In the case of the red claw crayfish (Cherax quadricarinatus), light intensity can have significant effects on the growth, development, and behavior of juvenile individuals. This article delves into the impacts of light intensity on red claw crayfish juveniles, exploring the potential consequences for their overall well-being and providing insights into the optimal light conditions for their successful rearing.

Growth and Development of Red Claw Crayfish Juveniles

Light intensity has been shown to affect the growth rates of red claw crayfish juveniles. Studies indicate that higher light intensities promote increased growth rates, potentially due to enhanced photosynthesis and primary production of algae within the crayfish's habitat. Adequate light exposure provides the necessary energy for efficient feeding and metabolism, leading to better growth and development.

Proper molting and shell hardening are crucial for the growth and survival of crayfish juveniles. Light intensity influences these processes by stimulating the production of the hormone responsible for molting (ecdysis). Adequate light exposure has been found to facilitate successful molting and promote the development of a harder and more resilient exoskeleton, protecting juveniles from predation and environmental stressors.

Behavioral Responses of Red Claw Crayfish Juveniles

Red claw crayfish juveniles exhibit phototactic behavior, meaning they are attracted to or repelled by light sources. Light intensity can influence their movement and distribution within their habitat. Higher light intensities often lead to increased activity levels and exploratory behavior, while low light conditions may result in reduced movement and increased hiding behavior. Understanding these behavioral responses is crucial for optimizing rearing conditions and managing crayfish populations effectively.

Light intensity also affects the feeding patterns and foraging behavior of red claw crayfish juveniles. Higher light levels stimulate feeding activity and increase the efficiency of food detection and capture. Crayfish exposed to optimal light intensities tend to exhibit more active foraging behavior, resulting in improved nutrient intake and growth. Conversely, low light conditions can reduce feeding activity, leading to decreased growth rates and potential nutritional deficiencies.

The effects of light intensity on red claw crayfish juveniles have significant implications for their growth, development, and behavior. Understanding these impacts is crucial for optimizing rearing conditions in aquaculture systems and managing natural populations effectively. Adequate light exposure promotes optimal growth rates, facilitates successful molting, and influences the behavioral responses of crayfish juveniles.

To ensure the well-being of red claw crayfish populations, it is important to consider the specific light requirements of these organisms. Balancing light intensity in rearing environments and natural habitats can lead to improved growth rates, enhanced shell hardening, and more efficient foraging behavior. Furthermore, the use of appropriate lighting technologies and management practices in crayfish aquaculture can contribute to sustainable production and the conservation of wild populations.

Future research efforts should continue to explore the intricate relationships between light intensity and the physiological and behavioral responses of red claw crayfish. This knowledge can help develop guidelines and best practices for the optimal management of these species, ensuring their sustainable utilization while preserving their ecological role in aquatic ecosystems.

Standardization of seed production of the Picnic seabream, Acanthopagrus berda, was taken up in captivity. Broodstock development of A. berda was done in 6 m diameter galvanized iron cages during September 2020 to March 2021 using commercial feed (40% protein) supplemented with vitamins and minerals. Males with oozing milt were available consistently throughout the period while asynchronized maturation of female was observed. A pair of mature male and a female (oocyte diameter of 440±12 µm) were induced using a dose gonadotropin releasing hormone analogue and female was given a similar second dose after 6 h. Spawning occurred after 42 h of induction. Eggs were incubated in fibre glass tanks (100 L) in seawater (34 ppt) with gentle aeration. Number of eggs spawned was 0. 25 million with a fertilization rate of 88% and hatching rate of 80%. Planktonic larvae measured total length (TL) 1.7±0.14 mm at 0 day post-hatch (dph), started exogenous feeding from 3 dph (TL 2.7±0.48 mm) when the mouth size was 180±2.8 µm. Yolk sac was completely exhausted by 3 dph. Co-feeding of rotifer Brachionus rotundiformis at 5 numbers (nos) ml−1 and nauplii of copepod (Parvocalanus crassirostris) at 3 nos ml−1 yielded better initial larval survival.