Induction of Molting in Hatchery-Reared Mud Crab *Scylla serrata* Juveniles

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Abstract

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The effects of lime, temperature and autotomy of chelipeds on growth, survival and molting of mud crab *Scylla serrata* juveniles were investigated under laboratory conditions. Hatchery produced *S. serrata* (45-day old) at the intermolt stage with internal carapace width of 2.0-2.3 cm and body weight of 1.7-2.2 g were exposed to lime concentrations of 0, 100, 200 ppm at daily and weekly application, temperature of ambient, 29, 32 and 35 ^{0}C and subjected to autotomy. The juveniles were allowed to molt twice prior to termination. The survival of juveniles declined with increasing levels of lime. Mean survival rate of juveniles without lime was 47% while 100 and 200 ppm lime ranged from 29 to 32%. No significant differences were found in the specific growth rate (% SGR) and molt interval (days) in all lime treatments after the first and second molts. All juveniles held in 35 ^{0}C had 100% mortality in the first molt due to incomplete molting therefore it was excluded from data analysis. SGR of crab juveniles in the ambient (2.75 ± 0.15%) and 29 ^{0}C (3.20 ± 0.18%) were comparable but significantly different ($P<0.01$) with those juveniles in 32 ^{0}C (4.12 ± 0.39%). The molt interval of the crab juveniles after second molt was significantly shorter with increasing temperature (29 ^{0}C: 32 ± 0.80 days, 32 ^{0}C: 28 ± 1.11 days) compared to ambient temperature (39 ± 0.93 days). The mean survival of juveniles in various temperature levels upon termination was 62, 85 and 65% for ambient temperature, 29 and 32 ^{0}C, respectively. Juveniles with intact chelipeds (5.80 ± 0.47%) and one cheliped autotomized (5.45 ± 0.30%) had a significantly higher SGR compared to juveniles with both chelipeds autotomized (4.20 ± 0.52%) in the first molt but no significant difference was observed in the second molt. This trend was observed because the autotomized chelipeds were not fully regenerated after the first molt. The molt interval was significantly shorter in the autotomized juveniles compared to juveniles with intact chelipeds. The interval was 36, 28 and 23 days for intact, one and two chelipeds autotomized, respectively. The survival of juveniles with intact chelipeds (60.61 ± 6.06%) was comparable with autotomized chelipeds (one cheliped: 59.60 ± 4.04%; two chelipeds: 47.22 ± 2.78%).

Based on the results, the suggested optimum temperature level for rearing *S. serrata* juveniles was at 29 ^{0}C. Likewise, autotomy of one cheliped can promote molting without adversely affecting the growth and survival of the juveniles. On the other hand, the application of lime did not improve the molting of juveniles due to occurrence of high pH and alkalinity. This also resulted in the low survival and growth of juveniles.

Key Words: Mud crab, molting, lime, autonomy, temperature