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Moulting of Freshwater Crab *Maydelliatelphusa masoniana* Reared in the Laboratory Conditions

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Abstract: Presently an experiment was conducted so as to understand the moulting behaviour in freshwater crab *Maydelliatelphusa masoniana* in the laboratory conditions. Out of eight crabs only five could moult while three died during ecdysis. All the crabs exhibited the same pattern of moulting viz., appearance of double lining in pereiopods, the old carapace becoming light in colour follow by its split along the posterolateral margin of the dorsal side, anterolateral border of the ventral side and posterior border of the chelipeds and legs. A new pre-exuvial soft layer is formed below the old carapace. The whole process of moulting got completed within 20-25 minutes.
Keywords: Crabs, size, moult, carapace, changes, chelipeds.

INTRODUCTION

Growth in crustaceans is characterised by the periodic replacement of the exoskeleton which takes place during the ecdysis process. For most of part of life cycle, the animal keep preparing for or recovering from ecdysis through physiological, metabolic, biochemical and behavioural changes [1]. Since crustaceans lose all of their hard parts during the moulting process, there is no method that can directly determine the age of these crabs. Studies of growth under experimental conditions provide data on the duration of the intermoult period and the growth rate during ecdysis. The results, however, cannot be extrapolated to the natural environment [2-4].

The moulting though observed almost throughout their life, however, its periodicity depends upon number of factors such as availability of food, temperature, size of the crabs and influence by hormones [5]. In India, most of the literature available with regards to the moulting of crabs is confine to marine crabs [6-8].

The present account gives some of the interesting information on the moulting of freshwater crab *Maydelliatelphusa masoniana* based on the observations made from the laboratory reared crabs.

MATERIALS AND METHODS

In the present studies, freshwater crabs *M. masoniana* have been collected by using drag net as well as hand from Gho-manhasan stream, Jammu. Crabs were carried to the laboratory, their mean weight, Carapace width (CW) & length and height of the larger cheliped were measured using a vernier caliper upto a precision of 0.1 mm and then reared in aquarium. The analyses were performed separately for males, females juvenile and adult growth stages. The experimental crabs were kept singly and the water was changed four times in a day and an aerator was provided. Each crab was fed with detritus, molluscs as well as fish muscles. The periodic moulting in the crab was followed by constant observations. The crab was weighed and measured after each moult and the data was recorded for the growth studies.

Crabs were classified according to their molting stage as follows: (a) Intermolt stage: crab with a hard carapace (b) Pre-molt stage: crab with a new shell growing under the old one or undergoing molting; and (c) postmolt stage: crab with a soft, bright colored shell.

RESULTS AND DISCUSSION

The crabs having hard exoskeleton were initially feeding on fish muscles and detritus regularly, however, later ceases to feed, indicating that the crab may undergo moulting at any time [5]. Out of the eight crabs however, only five were molted (3 immature females and two males) while three crabs (one male and two females) died during ecdysis.

In all the five crabs new cuticle became visible by the appearance of an internal line on both pereiopods that might be observe due to separation of old cuticle thereby forming a double line (fig, i). Present results are similar to [9] who also held that crabs show double line in preiopods at the time of moulting.

The old skeleton becomes light in colour and breaks along the posterolateral margin of the dorsal side, anterolateral border of the venral side and posterior border of the chelipeds and legs. A new pre-exuvial soft layer is formed below the old carapace. At this stage the crab came out from the old case leaving the skeleton almost intact (fig ii-v). Another interesting observation has been reported by author [10], while working on freshwater crab *Maja squido* held that crabs exhibit change in colour of abdominal vein from white to pink and then grey. Presently, however, no such change had been recorded at any point of time, thereby indicating this change in colour pattern might be a species specific feature. It takes about 20-25 minutes to complete the whole process of moulting. The newly moulted crab is less active and did not eat for two days. The body of newly moulted crab was very soft in the beginning, 40% hardened (30-40 hours), 50-55% hardened (on 50-70 hours) and 70-80% hardened (70-90 hours), and crab become completely hardened (after 96 hours). The method that uses carapace hardness is based on the consistency of the integumentary skeleton [10]. The size and weight difference of understudied crabs i.e. before and after molting are depicted in table (1).

Further during present study no molting was recorded in crabs having size 4 cm to 5 cm CW (carapace width) though crabs having size >5 cm CW found in natural habitat (stream) indicating that probably mature crabs either take longer time for molting or not able to acclimatise with respect to laboratory conditions. Present observations get a definite strength from these recorded by one of author [11] who studying molting in crab *Callinectes arcuates* held that mature crabs were unable to molt in the laboratory conditions though molting in nature was a common phenomenon.

Table-1: Showing variation in parameters during premolt and post molt

Carapace width before moulting	Weight of crabs before moulting (gms)	Size increase after moulting (cms)	Weight gain after moulting (gms)
2.8	10	3.2	22
3.2	18	3.8	36
3.5	28	4.0	40
3.8	32	4.4	44
4.2	38	4.6	48


Fig-(i)


Fig-(ii)


Fig-(iii)


Fig-(iv)


Fig-(v)


Fig-(vi)


Fig-(vii)

Fig-(i) Double lining in pereiopod, (ii) change in colour of carapace and chela during premolt stage in crab (iii-vi) molting in crab (vii) skeleton left after moulting

CONCLUSION

Maydelliatelphusa masoniana in the laboratory conditions exhibited the same pattern of moulting viz., double lining of pereiopods, the old carapace becoming light in colour follow by its split along the posterolateral margin of the dorsal side, anterolateral

border of the ventral side and posterior border of the chelipeds and legs. The whole process of moulting in the under studied crabs got completed within 20-25 minutes.

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