

**MOULTING AND MOULT QUALITY IN EYE-STALK ABLATED PENAEID PRAWN, METAPENAEUS MONOCEROS (FABRICIUS)**

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**Abstract:** Bilateral eyestalk ablation resulted in increase in frequency of moulting and unilateral ablation brought in moderate increase. Ablation effect on moulting was not affected by size differences. Considerable loss in dry weight of moults in the second and subsequent moults was observed in bilaterally ablated prawns and the shells were fragile and thin.

**1. Introduction**

Ablation of eyestalk is reported to accelerate moulting in crustaceans (Fingerman and Fingerman, 1974; Mauviot and Castel, 1976). While reduction in intermoult period subsequent to ablation was observed (Moynaux and Shirley, 1988), contrastingly increase in intermoult and decrease in carapace length were also reported (Nakatani and Otsu, 1981). Eyestalk ablations always led to high mortality (O'Halloran et al., 1988) and in most cases mortality occurred during moulting due to inability to shed the old shell.

The present experiment is to study the relationship between ablation and moulting frequency and to evaluate the quality of moult in terms of weight in the penaeid prawn, *Metapenaeus monoceros*.

**2. Material and Methods**

Prawns collected from Cochin backwaters were acclimatized to laboratory conditions. They were fed twice a day with crushed clam meat. Eyestalks of intermoult prawns immersed under precooled seawater were extirpated using UV sterilized surgical blades (no. 15). In bilateral ablation, removal of second eyestalk was postponed by 10-12 hrs to reduce mortality.

A closed recycling system of seawater was setup for conducting the experiments. Salinity of the system was maintained at 16.1‰ and temperature 26.1°C. Prawns were kept in individual compartments of about 4 litre capacity. Twenty four prawns, eight each of bilaterally eyestalk ablated (BEA), unilaterally eyestalk ablated (UEA) and control ones were maintained for each experi-

Table 1. Moulting frequency and intermoult days (IMD) of ablated and control *Metapenaeus monoceros*.

No.	Moulting frequency			35-40 mm size range IMD-1**			IMD-2***		
	BEA	UEA	Con.	BEA	UEA	Con.	BEA	UEA	Con.
1	3	2	2	6	9	10	5	.	.
2	3	3	1	6	8	.	4	6	.
3	3	3	1	7	9	.	5	6	.
4	3	3	2	5	8	10	5	7	.
5	3	2	1	6	9	.	5	.	.
6	3	2	2	6	8	9	6	.	.
7	3	2	2	7	8	11	5	.	.
8	3	3	2	7	7	11	6	.	.
Mean	3	2.5	1.6	6.2	8.2	10.1	5.1	6.5	.
65-70 mm size range									
1	3	2	2	7	9	12	6	.	.
2	2	1	8	10	.	.	.	.	.
3	2	1	1	8	.	.	.	.	.
4	2	1	1	8	.	.	.	.	.
5	2	2	1	9	10	.	.	.	.
6	3	2	1	8	11	.	7	.	.
7	2	2	2	8	11	.	.	.	.
8	3	1	1	7	.	.	7	.	.
Mean	2.4	1.6	1.2	8	10.2	12.5	7.0	.	.

. - No intermoult period

\*\* - First Intermoult days

\*\*\* - Second Intermoult days

Table 2. Dry weight of moults (gm) of ablated and control *Metapenaeus monoceros*.

No.	BEA			UEA			Con		
	Moult I	Moult II	Moult III	Moult I	Moult II	Moult III	Moult I	Moult II	Moult III
35-40 mm size range									
1	0.0099	0.0091	0.0070	0.0089	0.0086	*	0.0096	0.0094	*
2	0.0101	0.0094	0.0064	0.0106	0.0102	0.0100	0.0099	*	*
3	0.0108	0.0093	0.0064	0.0112	0.0108	0.0109	0.0106	*	*
4	0.0099	0.0082	0.0073	0.0093	0.0094	0.0101	0.0177	0.0119	*
5	0.0099	0.0082	0.0073	0.0093	0.0094	*	0.0093	*	*
6	0.0091	0.0073	0.0061	0.0099	0.0096	*	0.0082	0.0090	*
7	0.0113	0.0094	0.0084	0.0102	0.0100	*	0.0094	0.0092	*
8	0.0113	0.0103	0.0091	0.0123	0.0119	0.0120	0.0103	0.0100	*
Mean	0.0106	0.0091	0.0073	0.0110	0.0107	0.0108	0.0099	0.0099	-
65-70 mm size range									
1	0.0301	0.0271	0.0212	0.0319	0.0299	*	0.0316	0.0308	*
2	0.0312	0.0269	*	0.0323	0.0326	*	0.0323	*	*
3	0.0296	0.0251	*	0.0362	*	*	0.0309	*	*
4	0.0312	0.0261	*	0.0343	*	*	0.0316	*	*
5	0.0342	0.0281	*	0.0212	0.0309	*	0.0320	*	*
6	0.0294	0.0249	0.0201	0.0319	0.0313	*	0.0299	*	*
7	0.0314	0.0256	*	0.0301	0.0300	*	0.0291	0.0289	*
8	0.0286	0.0249	0.0200	0.0333	*	*	0.0318	*	*
Mean	0.0294	0.0256	0.0204	0.0315	0.0309	-	0.0304	0.0299	-

\* - No moulting

ment. Two size ranges of *M. monoceros* - 35-40mm and 65-70mm were subjected for study for a period of 15 days.

### 3. Results and Discussion

The results obtained on moulting frequency for the two size ranges of *M. monoceros* are given in Table-1 and that on moult dry weight in Table-2. Frequency of moulting was highest in BEA, moderate in UEA and lowest in control prawns. The average values of moulting frequency in the 35-40mm size range were 3.0, 2.5 and 1.6 respectively, and for the prawns of 65-70 size range the same were 2.4, 1.6 and 1.2, respectively. Significant reduction in intermoult periods was noticed especially in BEA prawns. The average first intermoult period in the 35-40mm size range of BEA, UEA and control prawns in days were 6.2, 8.2 and 10.1; the average second intermoult period for BEA prawns was 5.1 and UEA 6.5 days. Among the 65-70mm size group the average first intermoult periods were 8.0, 10.2 and 12.5 days and the second intermoult period of BEA prawns was 7.0 days. Neither the UEA nor the control prawns moulted for the third time.

Analysis of the dry weight of whole moult showed appreciable reduction in weight of the second and succeeding moults of BEA prawns. In the 35-40mm BEA prawns the average dry weight of 2nd moult was less by 14.20% than that of first. The weight of the third moult was 19.89% less than the second. Among the 65-70mm size the reduction in weight was by 12.9% and 20.3%. No significant changes in dry weight of successive moults was noticed among the UEA and control prawns of the two size groups.

The results of the study demonstrate that eyestalk ablation significantly increases the moulting rate in the penaeid prawn, *M. monoceros*. This is striking in the case of BEA prawns. Enhanced moulting in the ablated prawns irrespective of the size range may be possibly due to the involvement of moult inhibiting hormone (MIH). Similar observations have been made earlier in the grass shrimp (Freeman and Bartell, 1976). The reduction in the successive intermoult periods in BEA prawns further indicates the involvement of MIH in moulting.

Precocious moulting has found to affect the quality of moults formed in BEA prawns shown by the significant decrease in dry weight of successive moults. Formation of thinner carapace subsequent to ablation has been reported in crabs lobsters (Menon and Sivadas, 1968; Iglesia et al., 1987). The lesser time span of the intermoult period cannot be attributed to the formation of the thinner shells as corresponding decrease in intermoult period among UEA prawns did not result in thinner shells. Therefore, the formation of thinner moults in BEA prawns may be due to the reduced deposition of calcium chitin complex which may be influenced by eyestalk factors. The mortality observed in the BEA prawns and similar observations in other destalked crustaceans (O' Halloran et al., 1988; Molyneux and Shirkey, 1988) may be due to the formation of fragile exoskeleton and subsequent failure to shed the old exoskeleton in full resulting in the clogging of gills and appendages.

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