A NOTE ON THE CHANGES IN WATER CONTENT OF THE LOBSTER (*HOMARUS VULGARIS* M.-EDW.) DURING MOULT

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One of the lobsters kept in the tanks of the Plymouth Laboratory moulted on the night of 20 August 1940. This opportunity was taken to examine the changes in water content and osmotic pressure of the freshly moulted as compared with unmoulted lobsters. Though only one recently moulted individual has been examined, the results seem to be worthy of note since so far as we are aware no data are available on the subject in regard to *Homarus*. The biology of moulting among lobsters has received the attention of many investigators (vide Herrick (1895) and Drach (1939) for summary and literature).

The water content was determined by distilling the fresh lobster together with a known weight of sea water under xylol. This method is a modification of that of Dean and Stark which one of us (A. G. L.) has tried on a number of animals and found to give accurate results. The density was estimated by a modification of a method previously described (Lowndes, 1938). Osmotic pressure of blood and the external medium were measured by Baldes's (1934) modification of the Hill thermoelectric technique, as employed by one of us (N. K. P.) in the study of prawns and other crustaceans. The water content of the moulted skin was calculated from its dry weight taken after dehydrating in a hot air oven for 48 hr. at 105° C. Osmotic pressure was measured 17 ± 6 hr. after moult; density and water content after 34 ± 6 hr. The temperature of sea water at which the density was estimated was 17° C. Both lobsters were 4–5 years old as judged by Elmhirst's (1930) growth curve. The results obtained are given in Table I.

The higher values for density and sinking factor are just what one would expect from the highly calcified exoskeleton in the lobster of late intermoult phase. *Homarus* is a stenohaline invertebrate which is isotonic with its surroundings and it is interesting to note that more or less the same degree of osmotic equilibrium with the surroundings is observed in less than one day after moult. Hence, if there is any rapid rise in osmotic pressure prior to moult, as has been observed in some Crustacea, this anisotonicity disappears soon after moulting. The values of water content indicate that a lobster of fresh weight 100 g. loses about 28 g. when its skin is shed, and that it absorbs about 47 g. of water within 34 ± 6 hr. after moulting. Thus an increase in

weight of 19 % is observed in so short a period. Elmhirst (1930) has shown that this increase in weight during the post-moult phase may be as high as 38 %,

TABLE I

	Density g. per ml.	Sinking factor*	Osmotic pressure of blood % NaCl	Osmotic pressure of medium % NaCl
Soft lobster, ♀	1·077	1050	3·410	3·338
Hard lobster, ♀ (late intermoult)	1·158	1128	3·403	3·346

Lobster	Volume ml.	Gross weight g.	Wt. of water g.	% water	% water including moulted skin
Soft: ♀ after moult	110·02	118·47	97·43	82·24	77·30
Moulted skin alone	—	45·14	29·04	64·33	
Hard: ♀ late intermoult	136·13	157·61	105·16	66·82	66·68

* Sinking factor $= \frac{\text{Density of organism}}{\text{Density of medium}} \times 10^3$.

It may be seen from these figures that:
The amount of water in a lobster of dry weight 33·32 g. after moult

$$= \frac{33{\cdot}32 \times 77{\cdot}3}{22{\cdot}7} = 113{\cdot}5 \text{ g.}$$

Therefore the amount of water absorbed $= 113{\cdot}5 - 66{\cdot}68 = 46{\cdot}82$ g.

but it may be noted that the post-moult phase during which it takes place lasts from 15 to 30 days.

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