

ZOOLOGY

ON THE INFLUENCE OF TEMPERATURE AND OF LITHIUM CHLORIDE ON THE AMOEBOID MOBILITY OF UNSEGMENTED EGGS OF *LIMNAEA STAGNALIS* L.

BY

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1. *Introduction.*

Unsegmented eggs of *Limnaea stagnalis* show two periods of amoeboid mobility; the first period falls at the time of the extrusion of the first polar body, the second immediately after the extrusion of the second polar body. This mobility is apparent from the irregularity of the outline of the egg.

DE GROOT (1948), M. GRASVELD (1949) and RAVEN and ROBORGH (1949) observed abnormally strong movements in eggs, which had been treated with hypertonic, isotonic and hypotonic solutions of LiCl. Therefore further investigations were made on the influence of the temperature and of solutions of LiCl on the mobility of these eggs.

2. *Material and methods.*

Snails were stimulated to oviposit in the usual way (RAVEN and BRETSCHNEIDER 1942). With the experiments on the influence of temperature part of the capsulated eggs were kept at 29–33° C, part at 17–22° C and at 13–15° C in a water bath. About 350 eggs were observed. In the LiCl-experiments the eggs were decapsulated and transferred to solutions of LiCl of different concentrations, varying from 1 % to 0,006 %. Control eggs developed in distilled water and in their own capsules. About 1000 eggs have been studied in these experiments.

3. *Results of experiments.*

a. *Influence of temperature.*

The temperature did not perceptibly influence the degree of mobility of each egg individually. The movements of the eggs, developing at 29–33° C, were as strong as those of the eggs kept at 17–22° C and at 13–15° C. However, the number of eggs in which mobility occurred depended on the temperature. At 29–33° C only 4 out of 100 eggs, at 17–22° C 70 out of 130 eggs and at 13–15° C 80 out of 125 eggs showed amoeboid movements. The stage at which mobility occurred did not depend on the temperature.

b. Influence of LiCl.

LiCl influenced the degree of mobility of the eggs. In 1 % and 0,8 % LiCl no polar bodies were formed. No amoeboid movements were observed.

In 0,5 % LiCl development was inhibited after the first or second maturation division dependent on the circumstances. The formation of the second polar body was suppressed when freshly-laid eggs were transferred to LiCl immediately after oviposition, but the second polar body was formed, when the transfer to LiCl was delayed till the extrusion of the first polar body. If only one polar body was formed, there were yet two periods of mobility, corresponding with the periods of mobility of the controls. During the first period the amoeboid movements were somewhat stronger than those in the controls, during the second period they were much stronger. If the second polar body was extruded too, this was attended with strong amoeboid movements.

In 0,3 % and 0,19 % LiCl usually both polar bodies were formed. The mobility during the first period was a little increased as compared with the mobility of the controls; during the second period the mobility was very much increased. There were some differences between the effect of 0,3 % LiCl and that of 0,19 % LiCl. 0,3 % LiCl retarded the development of the eggs; LiCl 0,19 % did not. The eggs showed very small processes, when transferred to LiCl 0,3 %. Their outline appeared crenated. In 0,19 % LiCl, on the contrary, the outline was sinuate, the processes were much larger (fig. 1).

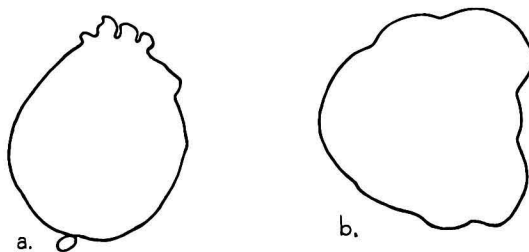


Fig. 1a. Egg, treated with 0.3 % LiCl. Second period of mobility.

Fig. 1b. Egg, treated with 0.19 % LiCl. Second period of mobility.

Solutions of LiCl more diluted than 0,1 % had no perceptible influence.

Capsulated and decapsulated eggs in 0,5 % and 0,3 % LiCl were compared. No difference between the mobility of these eggs was observed.

The moment at which amoeboid mobility occurred was not changed by LiCl, when it is related to the time the polar bodies were formed.

4. Summary.

The number of eggs which show amoeboid movements before the first cleavage depends on temperature. Low temperatures favour the

occurrence of amoeboid movements. The degree of mobility is influenced by LiCl. In hypertonic and isotonic solutions of LiCl strong amoeboid movements were observed, especially during the extrusion of the second polar body. Solutions more diluted than 0,1 % had no influence on amoeboid mobility.

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