

SHORT REPORTS

Effect of Crowding upon the Rate of Cleavage in the Sea Urchin Eggs

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FRANK and KUREPINA¹⁾ found that eggs kept singly showed not only delayed cleavage but also decreased viability in comparison with the control mass culture. MAXIA²⁾ performed experiments with *Paracentrotus* and found that the rate of cleavage is slower in isolated eggs than in crowded ones.

The present report deals with some results of experiments made in 1934 at the Misaki Marine Biological Station. Effect of crowding upon the eggs of *Anthocidaris crassispina*, *Pseudocentrotus depressus* and *Strongylocentrotus pulcherrimus* was studied. The rates of cleavage were compared between isolated eggs and group cultures containing 10 to 100 eggs in same volume of sea water. A glass plate (10×21 cm²) with 17 hollows was used. These hollows were filled with 2 to 10 drops of sea water. After semination the eggs were washed carefully to remove superfluous sperms. Eggs numbering 10, 20, 50 or 100 were kept in hollows as the case may be. The whole thing was put in a moist chamber.

In 29 out of 55 experiments performed on the eggs of *Anthocidaris*, isolated eggs showed delayed cleavage when compared with mass cultures. Twenty-three experiments showed no difference and in only 3 experiments isolated eggs grew faster.

Some of the data of the above-mentioned experiments with isolated eggs which showed retardation are given in the following tables:

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- 1) Roux' Arch. 121.
 - 2) Scritti biol. 8.

Exp. N 16

Temp. 25°C

Number of eggs in 5 drops of sea water	Stage of eggs	Time after fertilization			
		55m	1h	1h 25m	1h 45m
1	4-cell stage	—	—	20%	30%
	2-cell stage	20%	40%	80%	70%
	undivided	80%	60%	—	—
20	4-cell stage	—	—	20%	40%
	2-cell stage	20%	60%	70%	55%
	undivided	80%	40%	10%	5%
50	4-cell stage	—	—	30%	44%
	2-cell stage	32%	48%	66%	52%
	undivided	68%	52%	4%	4%

Exp. N 13

Temp. 25°C

Number of eggs in 5 drops of sea water	Stage of eggs	Time after fertilization				
		53m	58m	1h 3m	1h 10m	1h 10m
1	2-cell stage	—	20%	40%	60%	60%
	undivided	100%	80%	60%	40%	40%
20	2-cell stage	10%	40%	70%	95%	95%
	undivided	90%	60%	30%	5%	5%
50	2-cell stage	10%	34%	58%	76%	76%
	undivided	90%	66%	42%	24%	24%

Another series of thirty-three experiments was performed on *Pseudocentrotus depressus* and on *Strongylocentrotus pulcherrimus*. The result of these experiments may be summarily given as below:

Experiments on the eggs of

Pseudocentrotus

- 12.....isolated eggs cleaved slower.
 18.....no effect.
 3.....isolated eggs cleaved faster.

 33

Experiments on the eggs of

Strongylocentrotus

- 18.....isolated eggs cleaved slower.
 11.....no effect.
 4.....isolated eggs cleaved faster.

 33

Taking together all the experiments, it can be said that when the density of eggs is 20—30 in 5—10 drops of sea water they cleave fastest. The effect of crowding makes itself felt when the volume of water is less than 1cc. Above a certain temperature when isolated eggs may completely stop developping, the control mass culture develops normally. Therefore when the conditions become unfavorable, the isolated eggs are affected

more seriously than those in mass culture.

In another series of experiments³⁾ I have tested the existence or non-existence of mitogenetic radiations by means of various methods. But not a single evidence was obtained to show their existence. FRANK and KUREPINA and MAXIA attributed the effect of crowding upon the eggs to muto-induction of mitogenic rays, but so far as my experiments go there is no evidence to support their statement.

Postscript: W. C. ALEE and G. EVANS⁴⁾ published papers on some effects of numbers present on the cleavage rate and early development in *Arbacia* and showed that under a variety of experimental conditions, the eggs cleave more rapidly when in relatively dense as opposed to relatively sparse population. They discussed some possible causal factors.

Note préliminaire sur deux espèces nouvelles de trématodes du genre *Astiotrema*, provenant de *l'Amyda maackii**

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Astiotrema amydae n. sp.

Corps allongé et aplati, avec des marges parallèles; l'extrémité antérieure pointue, l'extrémité postérieure arrondie. Longueur totale du corps 4 mm., 8 et largeur maximum au milieu du corps mesure 0 mm., 83. Ventouse orale sphérique, subterminale, 0 mm., 22 de diamètre. Pas prépharynx. Globuleux pharynx suit immédiatement la ventouse orale, mesurant 0 mm., 13 de diamètre. Oesophage assez long, 0 mm., 35 de longueur. Cæca s'atteignent au niveau de testicule postérieur postérieur. Ventouse ventrale se trouve juste à midistance entre la ventouse orale et l'ovaire, à peu près sphérique, mesurant 0 mm., 25 de diamètre. Deux testicules se recontrent dans la partie antérieure de la moitié postérieure du

3) Journ. Fac. Sc. Tokyo Imp. Univ. IV 4.

4) Biol. Bul. 72: J. Cell. Comp. Phys. 10.

* Ces espèces ont été publiées à la neuvième réunion de l'Association Parasitologique du Japon organisée en avril 1937 à Tokyo, et la description détaillée paraîtra sous peu dans le "Science Reports of the Tokyo Bunrika Daigaku, Sect. B".