

## RESEARCH REPORTS

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### ECOLOGY OF THE ACORN BARNACLE, Balanus balanoides

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As part of a study of the energy flow through populations of acorn barnacles, mortality and growth were measured and compared between populations at three intertidal levels and between crowded and uncrowded barnacles. Data were taken between 27 July and 20 September.

The height above mean low tide, density, and mortality data are in Table 1. Probabilities of significant differences, as shown by chi-square contingency tests, are also given.

Table 1

Group	Height above MLT (ft.)	Area covered (sq. in.)	Initial number	Initial density number/sq. in.	Final number	% mortality	Significant differences
Upper uncrowded	9.6	55.7	169	3.03	169	0	} $p < .05$
Upper crowded	9.6	16.6	193	11.63	188	2.59	
Middle uncrowded	6.9	28.6	196	6.86	158	19.95	} $p < .001$
Middle crowded	6.9	16.2	258	15.93	150	41.86	
Lower "un- crowded"*	3.8	1.7	44	25.88	22	50.00	
Lower crowded	3.8	9.6	213	22.19	99	53.52	

\* Because of the high mortality and difficulty in recognizing individuals only a small part of the original area was included in the final analysis.

In both crowded and uncrowded groups, mortality was significantly higher at the middle level than at the upper level and significantly higher at the lower level than at the middle level. The main predator was the dog-welk, Thais lapillus, very common on rocks below mid-tide.

Barnacles were photographed, mapped, and the distance between the lateral plates determined to 0.1 mm. The change in this distance during the study divided by the initial distance is the percent growth. The square root of the percent growth was used in making comparisons with Student's t-test (Table 2).

Crowding reduced the percent growth at upper and middle levels. Growth was significantly

Table 2

Group	N	$\sqrt{\text{Percent growth}}$ and standard error	Significant differences
Upper uncrowded	146	$32.6 \pm 1.1$	} $p < .01$
Upper crowded	164	$21.8 \pm 0.9$	
Middle uncrowded	148	$47.9 \pm 1.4$	} $p < .01$
Middle crowded	125	$31.9 \pm 1.5$	
All upper	310	$26.9 \pm 0.8$	} $p < .01$
All middle	273	$40.6 \pm 1.1$	
All lower	112	$34.9 \pm 1.8$	} $p < .01$

higher at the middle level. Upper barnacles did not differ significantly in percent growth from lower barnacles.

Other t-test comparisons were made to determine the effect of the number of contacts with other barnacles on growth. Upper and middle barnacles with zero or one contacts significantly differed in percent growth from those contacting 4, 5 or 6 barnacles.

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#### RENAL TUBULAR REABSORPTION OF GLUCOSE IN Squalus acanthias

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The plasma glucose concentration (glucose oxidase method) of 16 female dogfish, taken 1 - 2 days following capture, averages  $0.90 \pm 0.49$  mg/ml. This value agrees closely with that found by Oppelt, Bunin and Rall (Life Sciences No. 7, p. 497, 1963), and is somewhat higher than the earlier published figures of Kisch (Biochem. Zt. 211:276, 1929).

At these plasma glucose concentrations little glucose is excreted in the urine. The urine of 2 of the 16 fish was glucose-free (less than 0.1 mg/ml). Twenty urine samples taken from the remaining 14 fish gave an average glucose concentration of 0.38 mg/ml (range 0.1 to 0.83 mg/ml).

The rate of renal glucose reabsorption was measured in 25 female dogfish before and after elevation of the plasma glucose concentration by infusion. Inulin, 200 mg IV, was given on the day prior to the experiment; this procedure was found to yield appropriate plasma inulin values of good constancy over the period of the next day's experiment. On the morning of the experiment a polyethylene catheter was tied into the fish's ureter and the stored urine expressed by gentle pressure over the pelvic girdle. A balloon was affixed to the catheter and a one-hour urine collection period begun. Arterial blood samples for glucose and inulin bracketed the urine collection period. Inulin was determined after yeasting the plasma filtrate or urine by Harrison's diphenylamine method (Proc. Soc. Exptl. Biol. and Med. 49:111, 1942). Filtered glucose was taken as