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SUMMARY REPORT

OF

STARFISH INVESTIGATIONS AT THE P. E. I. BIOLOGICAL STATION

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G. F. M. SMITH,  
November, 1938.

## SUMMARY REPORT

OF

## STARFISH INVESTIGATIONS AT THE P. E. I. BIOLOGICAL STATION

Several divergent aspects of the starfish work were pursued in 1938. Observations were made on the growth of starfish under unnatural conditions, in crates, using small mussels and small oysters as food. The experiments were started on May 28th and concluded on September 30th. For the duration of the experiment there was an excess of food available. The experiments were not expected to reflect the growth of starfish in nature but rather to indicate possibilities. The most significant result was that the starfish grew more rapidly with mussels as food than with oysters. The results were as follows:

<u>Original (average) diameter</u>	<u>Increase (4 mos.)</u>	<u>Food</u>
10.5 cm.	4%	Oysters
7.7	13%	"
5.4	35%	"
7.2	52%	Mussels
5.5	73%	"

It may also be seen that the smaller starfish grew relatively more.

In 1934 it was shown experimentally that adult starfish were killed by a continuous temperature above 25° C. and salinity below 14 o/oo, and that small starfish were more resistant to high temperature than were larger individuals. These experiments were confirmed by field observation. This year the experimental work was extended, using very small recently metamorphosed starfish. The minimum salinity was found to be the same but the lethal temperature was about 27½° C. The high temperature tolerance of the current year's starfish would, therefore, appear to be the principal reason that starfish of the current year survive

in some places that other starfish do not. Temperatures higher than  $27\frac{1}{2}^{\circ}$  C. are very rarely encountered.

About 5,000 starfish obtained by mopping were stained with Nile blue sulphate and released at two known points near the Biological Station. Recovery of stained specimens was attempted by further mopping. The starfish were released at places where there was not a concentration of oysters but where oysters were not far distant. The movements exhibited by the starfish were quite limited, the greatest distance travelled by an individual being 200 yards in four months and the average distance travelled only about 20 yards. The small movement observed seemed to be strictly random and not predominantly towards concentrations of oysters. This is not necessarily out of agreement with the observation previously reported in which starfish travelled 80 feet in a day directly towards a concentration of oysters at that distance. It would seem, therefore, that the movement of starfish towards food is not well marked unless the stimulus is quite strong and the food close at hand. The returns from the marking experiment were only about 5%. It is thought that many of the starfish were killed by heat when the temperature rose to  $25^{\circ}$  and  $25\frac{1}{2}^{\circ}$  C. in the last part of July and the first part of August.

Two experiments were carried out on the efficiency of mopping as a method of removing starfish from an oyster bed. In the experiments lots (1,600 and 3,100) starfish were stained and placed on the bottom again. In each case over 70% of the starfish were recovered a few days after being put out. Of the number not recovered, it is thought that many were probably killed but not picked up by the mops being repeatedly

dragged across the area. For the duration of the experiment stained starfish and unstained controls were kept in tanks. There was no significant mortality.

These studies probably end the writer's investigations on starfish as time will not be available from the pressing lobster investigations.

G. F. M. Smith,  
November 6, 1938.

ROYAL CANADIAN MOUNTED POLICE