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STARFISH INVESTIGATIONS

at the

Prince Edward Island Biological Station

during the summer of 1937.

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G. F. M. Smith,
Oct. 16th, 1937.

Plankton Tows.

During the spring of 1937 a series of plankton tows was made at the Prince Edward Island Biological Station, using a No. 5 net, for starfish larvae. The purpose of these tows was to check the time of spawning of starfish and settling of larvae against records of the previous years. Some spawning took place at or near the two plankton stations in the latter part of May. At this time the temperature was about 13°C. This is lower than the temperature at which starfish spawning took place in 1935 (about 16°C). As observed in previous series of tows the free swimming life of the starfish was about three weeks.

The significant data from the analysis of the plankton tows are given below. All tows were with a No. 5 net at the surface and of ten minutes duration.

Mud Digger Point

<u>Date</u>	<u>Time</u>	<u>Starfish Larvae</u>
17/5/37	13:15	None
21/5/37	15:00	"
26/5/37	15:30	Gastrulae, Bipinnaria
31/5/37	11:00	None
5/6/37		"
7/6/37	11:45	Bipinnaria
11/6/37	10:00	Bipinnaria
15/6/37		Brachialaria
18/6/37		Brachialaria
22/6/37		None
29/6/37		"
2/7/37		Brachialaria
5/7/37	15:00	None

Hydrographic Station 2007

<u>Date</u>	<u>Time</u>	<u>Starfish Larvae</u>
17/5/37	10:30	None
21/5/37	14:00	None
26/5/37	15:00	Gastrulae
31/5/37		Bipinnaria
5/6/37		None
7/6/37		Bipinnaria
11/6/37	11:00	Bipinnaria, Brachialaria
15/6/37		Bipinnaria, Brachialaria
18/6/37	10:45	Brachialaria
26/6/37	10:00	None
2/7/37	15:15	Brachialaria

Measurement of Starfish from Oyster Beds.

Records were kept of the volume in gallons of all starfish removed from the Department of Fisheries' oyster areas. Most of these data are not sufficient either in quantity or accuracy to be tabulated statistically. The following table is of the most significant results, that is, of data from areas where most starfish were removed. It is difficult also to estimate the area from which the starfish are taken.

<u>Place</u>	<u>Vol. in gals.</u>	<u>Av. Diameter in Cm.</u>
Cooper bed	34	3½ - 4
Totten bed	27	6 - 6½
Fred England bed	24	7
Shipyards Pt. bed	9	7

Assuming that these figures are valid they may either indicate that where starfish population is most dense the starfish are of smaller average size or there may be a rough increase in size as the upper parts of the inlet are approached. This latter possibility has no other evidence to support it but the first suggestion is in general accord with opinions of the writer given in previous reports and with rate of growth experiments. In any case the problem of starfish size is probably one of food supply.

Temperature and Starfish Distribution

In the spring of 1937 starfish were present in a small almost land-locked very shallow cove at the mouth of Claude William's creek. These starfish were all of one year class and samples were being taken every month to follow the growth. On July 15th no starfish could be obtained from this small area. The temperature at the Prince Edward Island Biological Station stage had been up to 24.8°C at the surface on July 5th, and above 22°C on two previous and four subsequent occasions, all between the middle of June and the middle of July. No actual temperature records were taken in the creek but the temperature would certainly be in excess of that at the station stage, presumably 3 or 4 degrees higher. During the second week in August the water temperature at the station stage was up to 27.3°C and almost continuously over 25°C. The starfish along the shore as observed in October were greatly reduced in number. Those present in October might have emigrated in from deeper water in the meantime. These two observations, however inaccurate they may seem by themselves, are completely in accord with laboratory experiments in 1934 and field observations of 1935 which led to the conclusion that sustained temperature above 25°C was lethal to starfish.

STARFISH INVESTIGATIONS AT P. E. I. BIOLOGICAL STATION

Summary for 1937.

A series of plankton tows with a No. 5 net indicated that the starfish began to spawn in the latter part of May with a water temperature of about 13°C and that the duration of the free swimming life of the starfish was about three weeks. These data correspond with previous findings except that the temperature of spawning is somewhat lower than observed before.

Records of volume of starfish mopped from the Department of Fisheries' oyster areas and the size of the starfish taken indicate that roughly the larger the starfish population on an area the smaller the size of the individuals making up the population. The problem, therefore, resolves itself into one of food supply. It was previously shown experimentally that size of starfish is an index of food supply rather than age although age must be a factor.

Warm water, above 25°C, in August was found to limit the distribution of starfish in shallow water areas near the Biological Station. This is further field confirmation of experiments in 1934 which showed that under laboratory conditions the starfish were killed by a continuous temperature above 25°C.

G. F. M. Smith,
P.E.I. Biological Station,
October 16th, 1937.