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Observations on a bloom of Flagellate "X" in the
West of Ireland

by

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ABSTRACT:

In July 1983 major mortalities of farmed trout and salmon were associated with a bloom of an unidentified organism hitherto unrecorded in Ireland. Three further blooms occurred in 1984, two of which were associated with mortalities. The morphology of this organism (Flagellate "X") as observed in 1983 is described.

RESUME:

En Juillet 1983 les mortalities de saumon et truite sont passe pendant un eau rouge de Flagellate "X" qui jus qua ce moment n'etarent pas enregistre en Irlande. Il y avait trois autres eaux rouges en 1984, deux etait associe avec des mortalities. Le morphologie de Flagellate "X", Comme on observait en 1983, se decrira.

INTRODUCTION:

On July 29th 1983 in Bellacragher Co. Mayo (Fig. 3) a large fish kill took place at a mariculture installation (J. Doyle et al 1984). A 2 litre fresh surface water sample was collected from the cage site that day and placed on ice, arriving at our field laboratory the following morning. Half of the sample was fixed using Lugol's iodine and the remainder was analysed immediately. Flagellate "X" was identified as the dominant organism. Flagellate "X" sensu Droop, Jones and Tett 1979 is a taxonomically undefined species, possibly a Chloromonad or Chrysophyte (in either the genus Olithisodiscus or the genus Chattonella). It has been implicated in fish kills at mariculture operations in Scotland since 1979.

Methods

Phytoplankton was enumerated using 25 ml settling chambers and an inverted microscope. The morphology of Flagellate "X" was studied using a light microscope with a maximum of 400 x magnification. No photographic facilities or greater magnification was available in our field laboratory and the morphology of Flagellate "X" as described is based on drawings made at that time. (Fig. 1 and 2).

Conclusions:

Since 1976, phytoplankton monitoring of Irish coastal waters has been undertaken and at no stage was any organism resembling Flagellate "X" observed until 1983. In blooms of Flagellate "X" in Ireland the following factors were common to all.

- 1) The blooms developed quickly and were of short duration (J. Doyle et al 1984).
- 2) They all occurred in the vicinity of fish cages
- 3) Water temperature does not appear to be an important factor
- 4) Calm warm conditions

The exact nature of the toxicity of Flagellate "X" is as yet unknown, and attempts to culture it have been unsuccessful. At the final stages of the breakdown of Flagellate "X" under the microscope the nematoblasts? explode producing fine tubes radiating outwards and perhaps in bloom conditions when on the gills of fish (as observed in 1983) they may

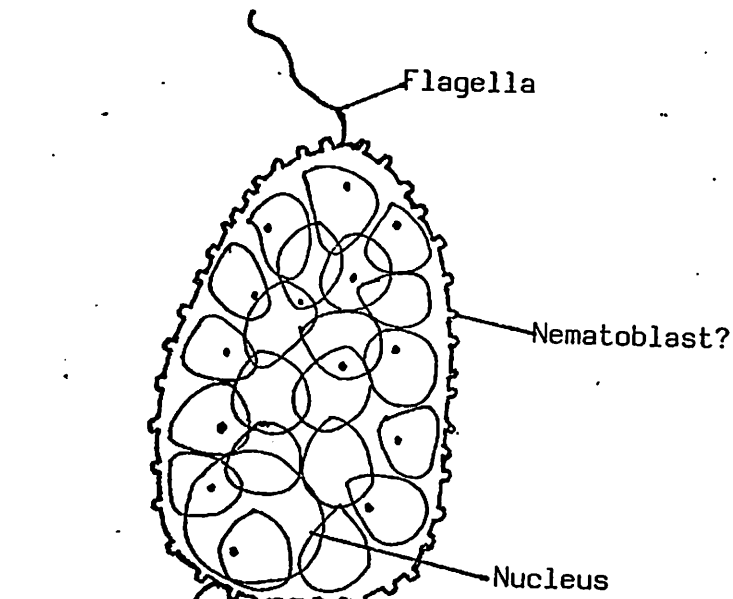
have some irritative effect on the gill tissue. When Flagellate "X" breaks down completely the particles contained are released, and on July 30th 1983 at the peak of the bloom these particles reached maximum concentration at 9m (7×10^6 particles/litre) while at the surface the maximum was 1×10^6 particles/litre. Flagellate "X" itself was evenly distributed down to 6m while at 9m it was reduced to 0.01×10^6 cells/litre.

A major problem with working with Flagellate "X" is that long term storage is not satisfactory. Examination of samples some months later show that the number of particles increase, suggesting breakdown of Flagellate "X". Accurate counts are thus impossible unless estimates are based on particle counts as against intact Flagellates to give the probable original number.

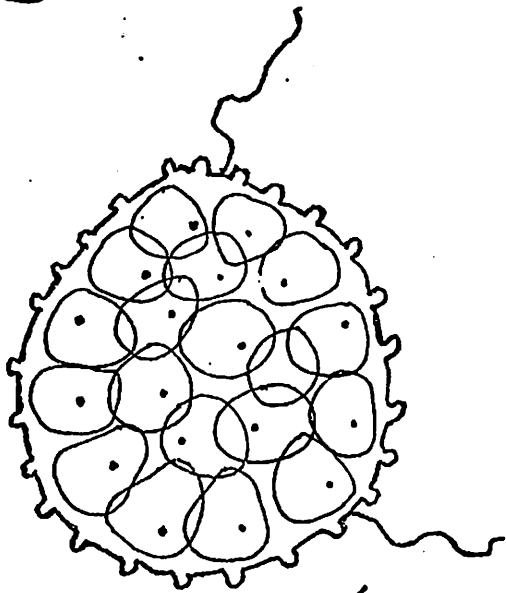
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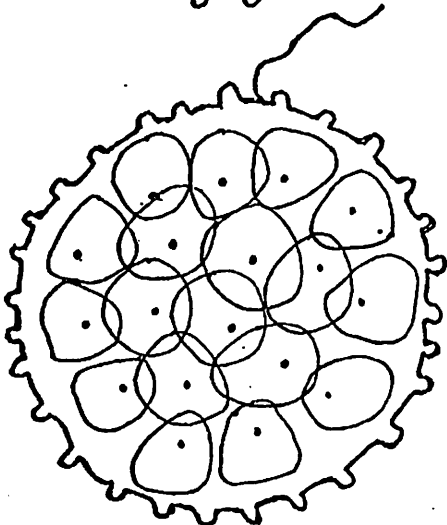
MORPHOLOGY



A) Flagellate "X"



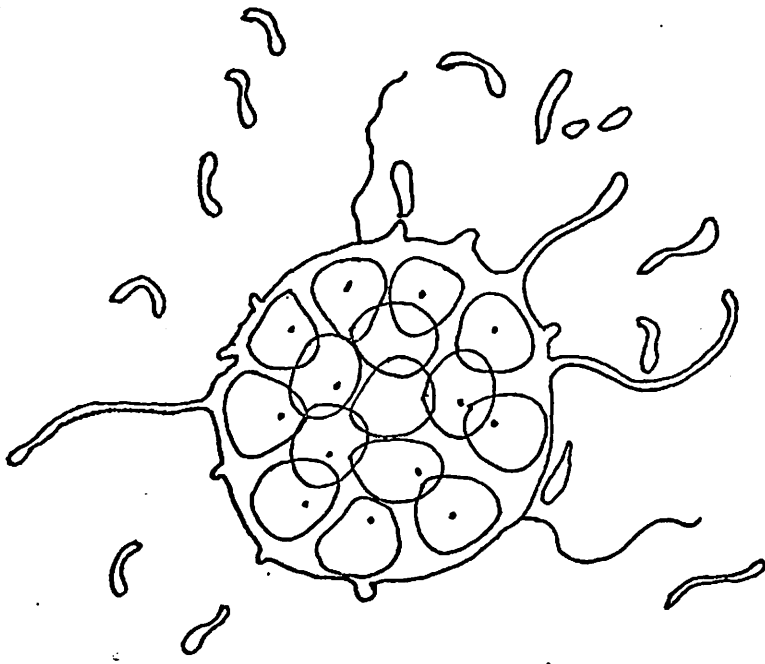
B) 3 minutes under microscope cell beginning to round off. Nematoblasts become more prominent.



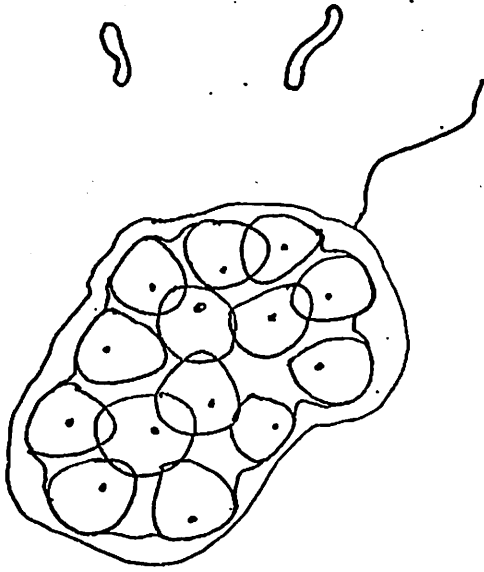
C) 8 minutes under microscope cell totally rounded.

20 μ

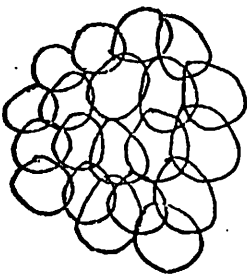
MORPHOLOGY (continued)



D) 10 minutes under microscope.



E) 12 minutes under microscope.



F) Lugols iodine fixed sample.

20 μ

Fig 3

Location of

Bellacragher Bay

