

This paper not to be cited without prior reference to the authors

International Council for  
the Exploration of the Sea

C.M. 1971/L:9  
Plankton Committee  
Ref.:E(Fish. Improve. Cttee)

Distribution of marine dinoflagellates around  
the British Isles

by

J. D. Dodge and Mrs J. H. Carslake  
Botany Department, Birkbeck College, London, W.C.1

Although plankton samples have been examined for many years at a number of laboratories around the British Isles, there has been no attempt to correlate the results obtained. Thus there is no overall picture available for the pattern of seasonal and geographical distribution of dinoflagellates around our shores. The need for such information has become evident in recent years when toxicity, thought to be due to dinoflagellates, has appeared amongst marine animals on several occasions. The present study is being carried out in order to try to fill in this gap in our knowledge of this important group of flagellates.

#### SAMPLING SITES AND METHODS

During 1970-71 samples were collected from Portsmouth and Plymouth on the south coast, Conway and Port Erin on the west, Oban and Loch Ewe in western Scotland, and from St. Andrew's, Newcastle, Lowestoft and Burnham-on-Crouch on the east coast. Occasional samples were obtained from the Kent and Sussex coasts, Swansea, Isles of Scilly, Menai Straits, the Firths of Clyde and Moray, and from Whitby. For 1971-72, it is hoped to obtain additional samples from other sites.

Each sample generally consists of three parts: 150 ml sea water unfixed; 150 ml sea water fixed with Lugol's iodine; a sample obtained by use of a phytoplankton net and fixed in formalin. The fresh sample is useful for observing the small dinoflagellates which are normally lost in fixation. Part of this sample is placed in a culture cabinet and observed at intervals. Crude cultures of genera such as Oxyrrhis and Gymnodinium are often obtained in this way. The Lugol's sample is intended for quantitative analysis using the inverted microscope. The net sample is the most useful for identifying the armoured dinoflagellates and provides the larger numbers of cells which are needed for taxonomic work. Material from these samples is also being examined by scanning electron microscopy.

## RESULTS

To date 98 species representing 34 genera have been identified. The table (Fig. 1) illustrates the seasonal and rough geographical distribution of 23 of the more common species. Four *Ceratium* spp. (*C. fusus*, *C. furca*, *C. longipes*, *C. tripos*) appeared throughout the year, and there was no apparent geographical restriction. *Ceratium lineatum*, a northern sp., was found only in summer; *C. reticulatum* and *C. buceros f. tenue* occurred only in winter and were restricted to the south coast.

*Peridinium depressum* was widely distributed and was recorded throughout the year, and *P. pellucidum* and *P. trochoideum* occurred during most of the year except in spring. The other *Peridinia* bloomed in summer and autumn, *P. ovatum* mostly in the north, *P. cerasus* notably absent in the west, while *P. crassipes* and *P. leonis* were widely distributed.

*Gonyaulax* spp. were well represented in the summer months, and were most abundant in the north and north-east; they were absent in the Irish Sea. *G. diegenesis* occurred in early summer, and *G. digitale*, *G. polygramma*, *G. tamarensis* all during the summer. *G. polyedra* bloomed in spring and autumn, and *G. spinifera* occurred throughout the summer and autumn.

*Dinophysis acuminata* was present throughout the summer and autumn, mostly in the west and north-west, but *D. norvegica*, very abundant in early summer, was found only on the east and north-east coast.

*Prorocentrum micans* was abundant throughout the summer and autumn, occurring everywhere except in the east, where it was never recorded.

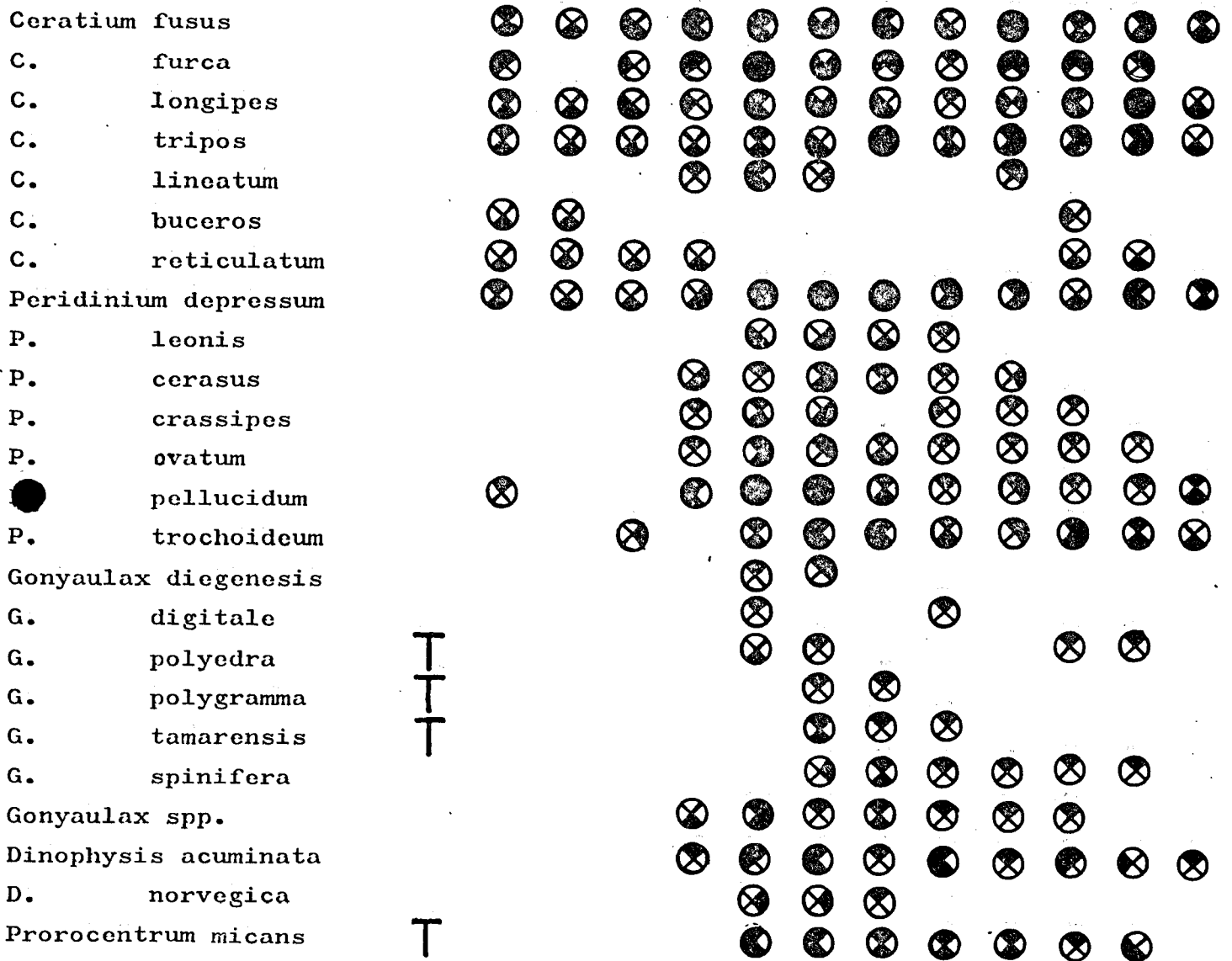
## TOXIC DINOFLAGELLATES

Of the world total of 32 dinoflagellate species which are reputed to be toxic only 17 have previously been recorded around the British Isles. To date we have encountered only eight of these. It is notable, in fact, that the majority of common dinoflagellates recorded are not toxic, and that over the period sampled the non-toxic forms generally occurred in greater numbers. Of the toxic species, *Amphidinium carteri* occurred in Kent in October, and *Prorocentrum micans* was found during the summer months (May-October) in Plymouth, Swansea, Firth of Clyde and Oban, though it appeared to have two blooms in Portsmouth and Port Erin, one in early summer, and one in November; *Glenodinium foliaceum* was recorded only once, from Burnham-on-Crouch in October. The toxic *Gonyaulax* spp. (*G. polygramma*, *G. tamarensis* and *G. catenata*) were restricted to the summer months, although *G. polyedra* seems to occur

only in spring and autumn in the north and only in May in Plymouth. Other unidentified Gonyaulax spp. occurred in Oban, Moray, Kent and Plymouth during the summer months. Noctiluca scintillans was found in Plymouth in August.

It is intended to continue the sampling programme in the coming year and to try to gain a more complete picture of dinoflagellate distribution by regular sampling from additional sites. We are grateful to those who have co-operated in sending us samples during 1970-71 and to the Natural Environment Research Council for supporting this work. Offers of further samples or data on distribution will be most welcome.

Toxi- Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
city



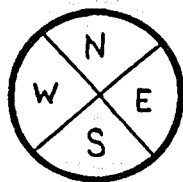
T  
T  
T

T

Fig. 1.

DIAGRAM TO ILLUSTRATE THE SEASONAL AND GEOGRAPHICAL DISTRIBUTION OF THE MORE COMMON DINOFLAGELLATES FOUND AROUND THE BRITISH ISLES, 1970-1971.

The coastline is divided into sampling zones as follows:



North from Clyde to Moray  
East from St. Andrews to Kent.  
South from Sussex to Isles of Scilly.  
West from Swansea to Port Erin.

Shading represents occurrence of a species in that zone.