Dinophysis species in Irish waters 1990 - 1993

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Abstract

The distribution and abundance of Dinophysis species as recorded in the national phytoplankton monitoring programme are described. An apparent spread in the occurrence of Dinophysis to the west coast of Ireland is reported. The lack of correlation between the concentrations of Dinophysis in the water and DSP toxicity in shellfish is reported on and discussed.

Introduction

Dinophysis species have been implicated as the cause of DSP (Diarrhetic Shellfish Poisoning) in Europe since the early eighties. Kat (1983 and 1985) reported that D. acuminata was the distinct cause of DSP in the Netherlands. In Norway concentrations of Dinophysis species of 20000 - 30000 cells per litre were reported to cause DSP (Dahl and Yndestad, 1985). In this case the most abundant species were D. acuta in the autumn and D. norvegica at the end of the year with D. acuminata occurring in more modest numbers.

Lassus et al (1985) reporting on DSP in France caused by D. acuminata cited 200 cells per litre as being the action level at which areas are closed to shellfish harvesting and Marcaillou-Le Baut et al (1985) established a correlation between D. acuminata concentrations in excess of 200 cells per litre and DSP toxicity.

This paper describes the recorded occurrence of Dinophysis species at concentrations higher than 200 cells per litre in Irish coastal waters.
Methods

Phytoplankton samples were collected using a Ruttner sampling bottle which was then subsampled. Samples were preserved in lugols iodine for later identification and enumeration using settling chambers and an inverted microscope.

Results

Four species of *Dinophysis* were recorded during the course of this study, *D. acuminata*, *D. acuta*, *D. rotundata* and *D. norvegica*. Only two, *D. acuminata* and *D. acuta* were recorded in concentrations in excess of 200 cells per litre.

In 1992 there was a sharp increase in the number of samples in which *Dinophysis* species were recorded over the previous two years (Table 1). It is too early to say if this increased number of records will be maintained in 1993.

<table>
<thead>
<tr>
<th>Year</th>
<th><em>D. acuminata</em></th>
<th><em>D. acuta</em></th>
<th>Samples examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>68</td>
<td>43</td>
<td>2175</td>
</tr>
<tr>
<td>1991</td>
<td>43</td>
<td>50</td>
<td>2302</td>
</tr>
<tr>
<td>1992</td>
<td>141</td>
<td>120</td>
<td>2803</td>
</tr>
</tbody>
</table>

Table 1. Number of samples recorded with concentrations higher than 200 cells/l.

There was a similar increase in the number of locations where *Dinophysis* species were recorded at concentrations in excess of 200 cells/l in 1992 (Fig. 1). In 1992 *D. acuminata* and/or *D. acuta* were recorded at eight locations on the west coast. In fact one of the earliest occurrences of *D. acuta*, in significant numbers, (240 cells/l) was in Ardbear Bay, Co. Galway (Table 2). In 1993 *Dinophysis* species are again being recorded on the west coast in significant numbers.
Table 2. Occurrence of Dinophysis species at concentrations greater than 200 cells/litre. [Date, (location), number of cells/l]

Dinophysis species have occurred in inner Bantry Bay every year during the study period (Fig. 2 and Fig. 3). These concentrations have given rise to DSP toxicity annually. However it has not been possible to show a close correlation between Dinophysis and toxicity (Fig. 3).
Discussion

The occurrence of *Dinophysis* species at an increased number of locations in 1992 and 1993 has been accompanied by the occurrence of DSP toxicity at an increased number of locations (Jackson et al., 1993). It is not clear whether this represents a spread of the problem or is just a manifestation of normal interannual variations in the occurrence of *Dinophysis*.

While it remains a good indicator of areas requiring toxicity testing, the lack of good correlation between *Dinophysis* numbers and DSP toxicity limits the usefulness of phytoplankton monitoring as a tool for toxin prediction. The difficulty in obtaining a good correlation may be due to the relative abundance of non-toxic species co-occurring with the toxic ones as suggested by Sampayo et al. (1990). Another possibility is that we may be missing pulses of *Dinophysis* which come into the bays during relaxation of upwelling events and leave again as upwelling is re-established (Raine et al., in press).

References

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Marcaillou-Le Baut, C., Lucas, D. and Le Dean, L. 1985  
*Dinophysis acuminata* Toxin: status of toxin bioassays in France.  

Dinophysis spp. toxicity and relation to accompanying species.
Figure 1a. Dinophysis (greater than 200 cells/l) 1990
Figure 1c. Dinophysis (greater than 200 cells/l) 1992
Figure 2. Dinophysis in Inner Bantry Bay
Figure 3a: Dinophysis and DSP Toxicity in Banty Bay (Denmark)
Figure 3b. Dinophysis and DSP Toxicity in Bantry Bay (North Chapel)