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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.

Year	*D. acuminata*	*D. acuta*	Samples examined
1990	68	43	2175
1991	43	50	2302
1992	141	120	2803

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.

Year	1st Record	Max cells/l	Last Record
1990	16 July (Bantry) 400	11 Aug (Bantry) 279000	30 Aug (Youghal) 840 cells/l
1991	19 June (Bantry) 1440	11 Sept (Bantry) 2160	15 Sept (Bantry) 880 cells/l
1992	14 June (Bantry) 440	8 Aug (Youghal) 2960	24 Aug (Bantry/Kenmare) 240 cells/l
a. *D. acuminata*			
1990	25 July (Bantry) 440	11 Aug (Bantry) 176000	28 Aug (Bantry) 1040 cells/l
1991	14 July (Bantry) 880	11 Sept (Kenmare) 11000	26 Sept (Bantry) 720 cells/l
1992	14 June (Bantry) 800	15 July (Bantry) 1680	24 Aug (Kenmare) 280 cells/l
b. *D. acuta* (southwest coast)			
1992	15 June (Ardbear) 240	27 July (Killary) 1120	22 Sept (Killary) 520 cells/l
c. *D. acuta* (west coast)			

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).

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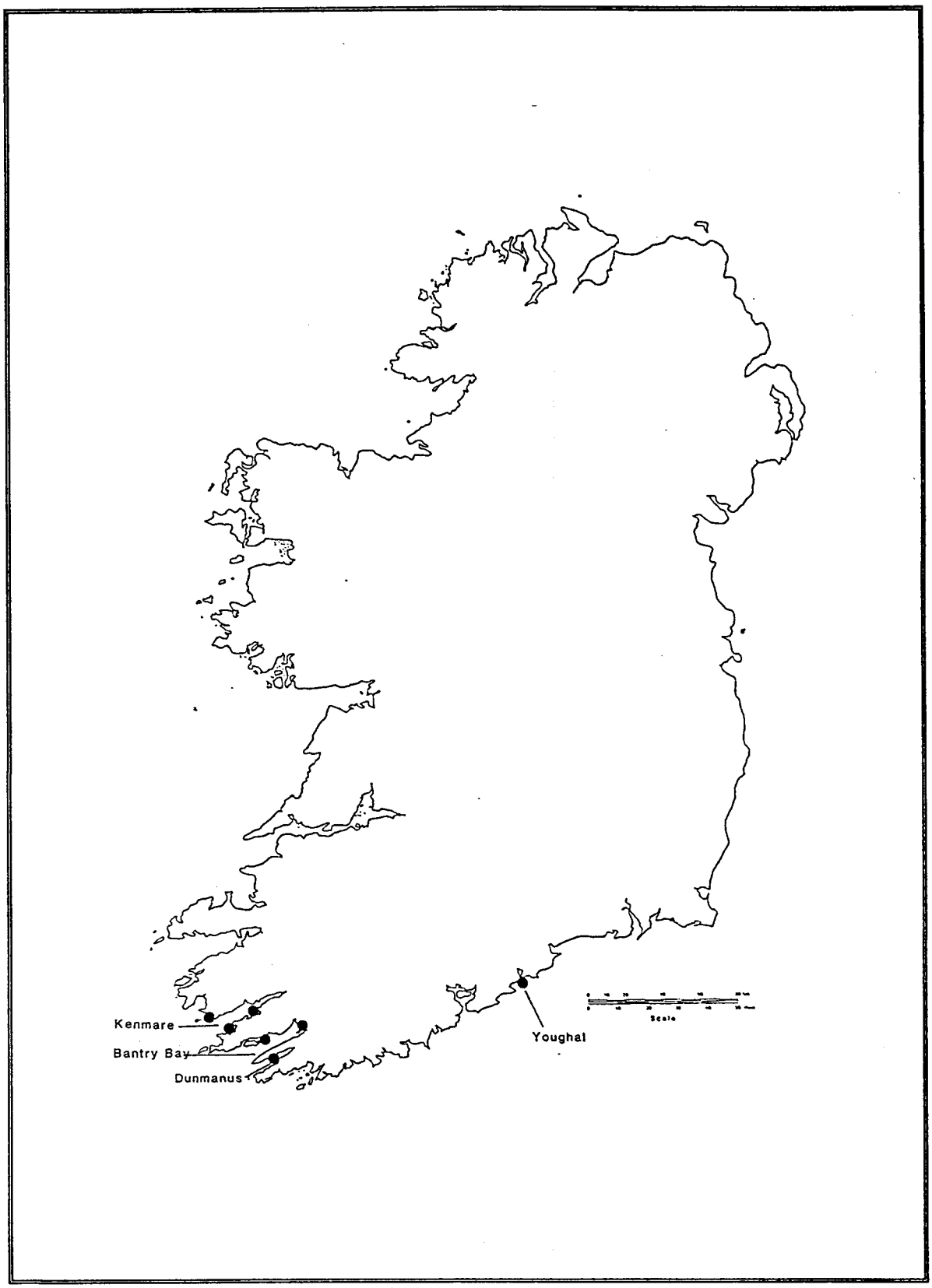


Figure 1a. **Dinophysis (greater than 200 cells/l) 1990**

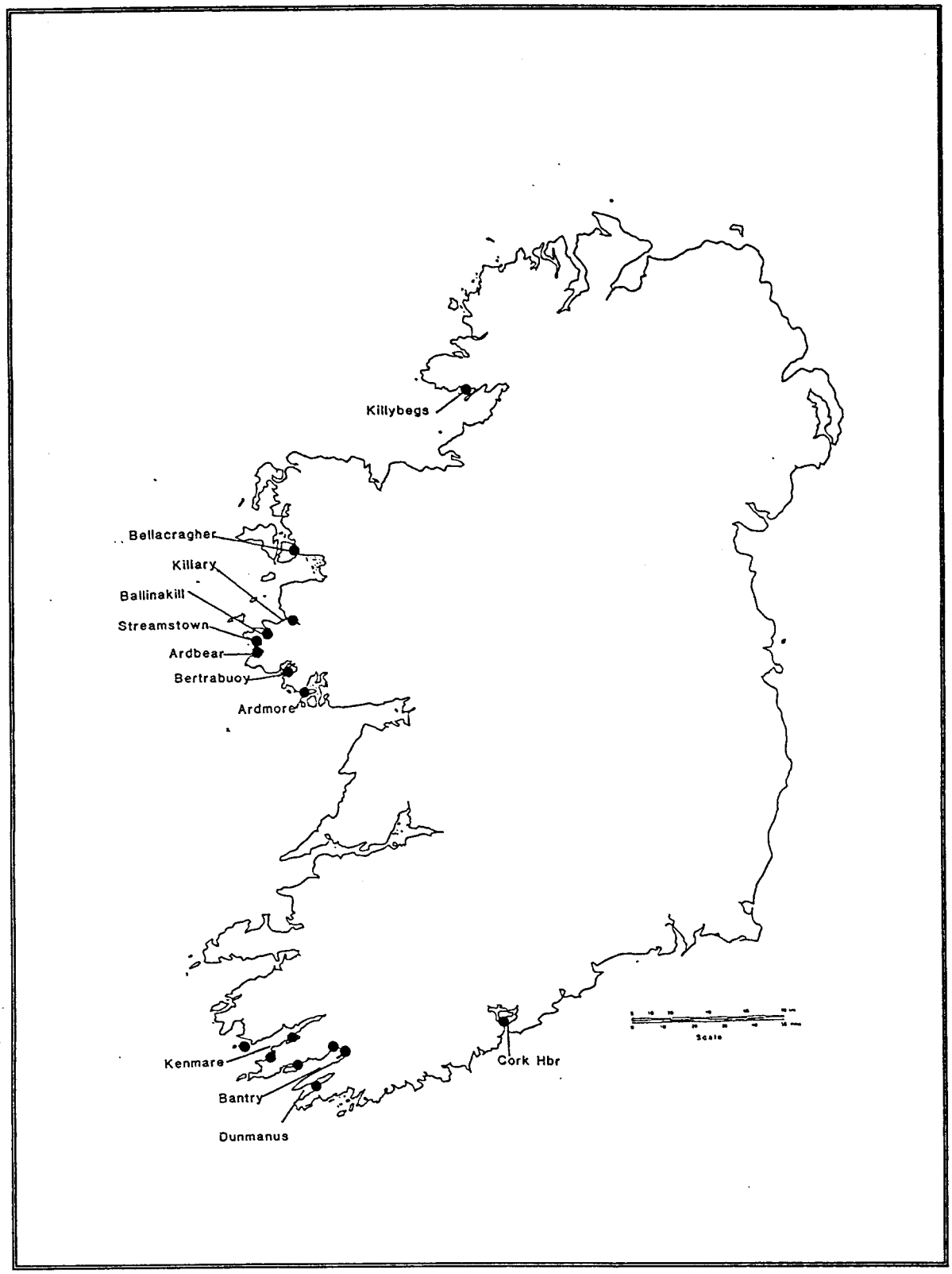


Figure 1c. **Dinophysis (greater than 200 cells/l) 1992**

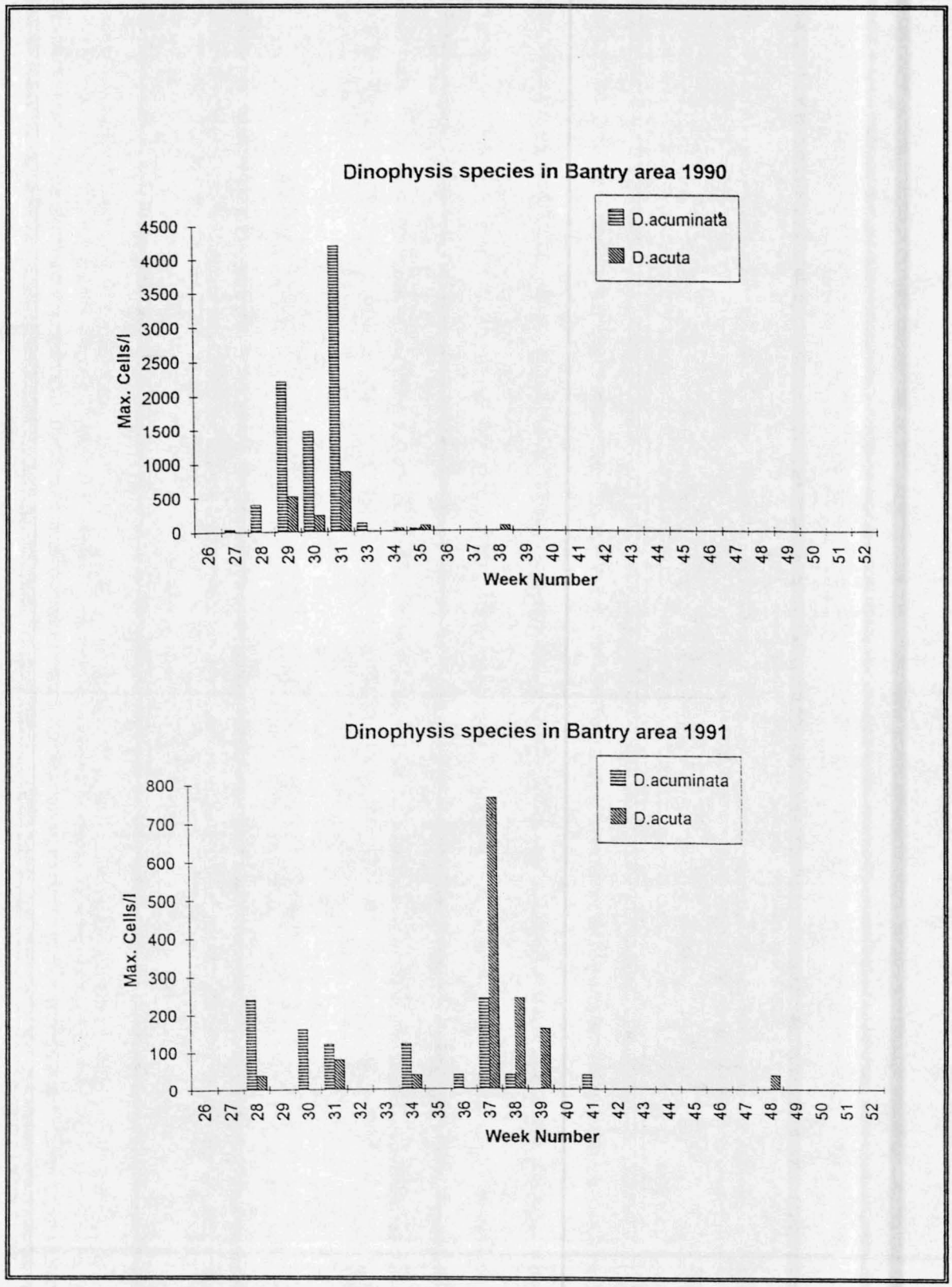
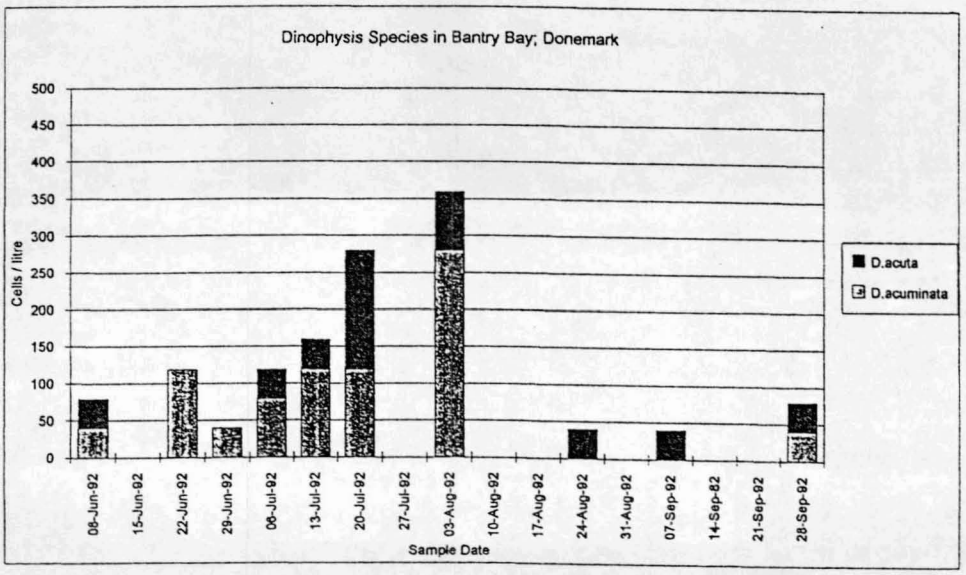


Figure 2. **Dinophysis in Inner Bantry Bay**



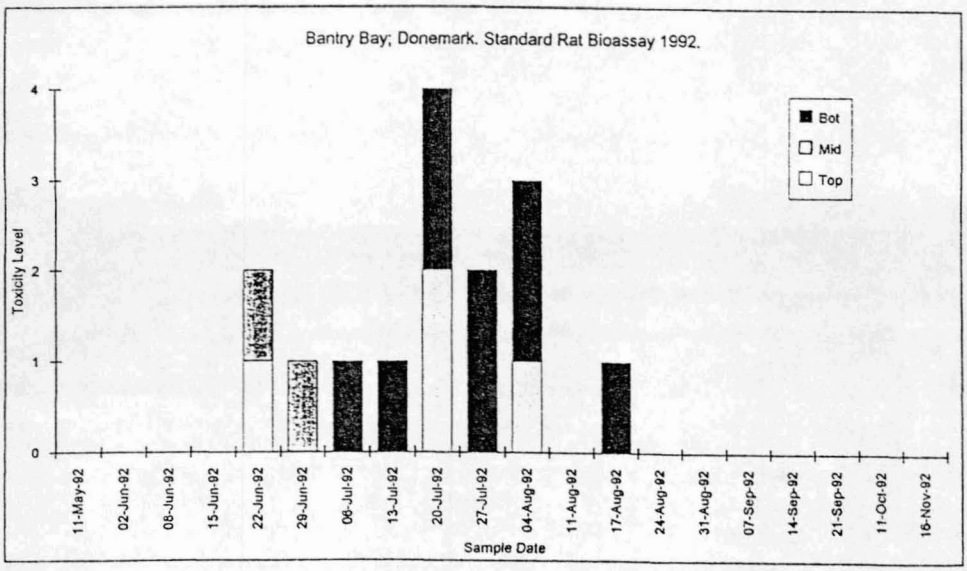


Figure 3a. **Dinophysis and DSP Toxicity in Bantry Bay (Donemark)**

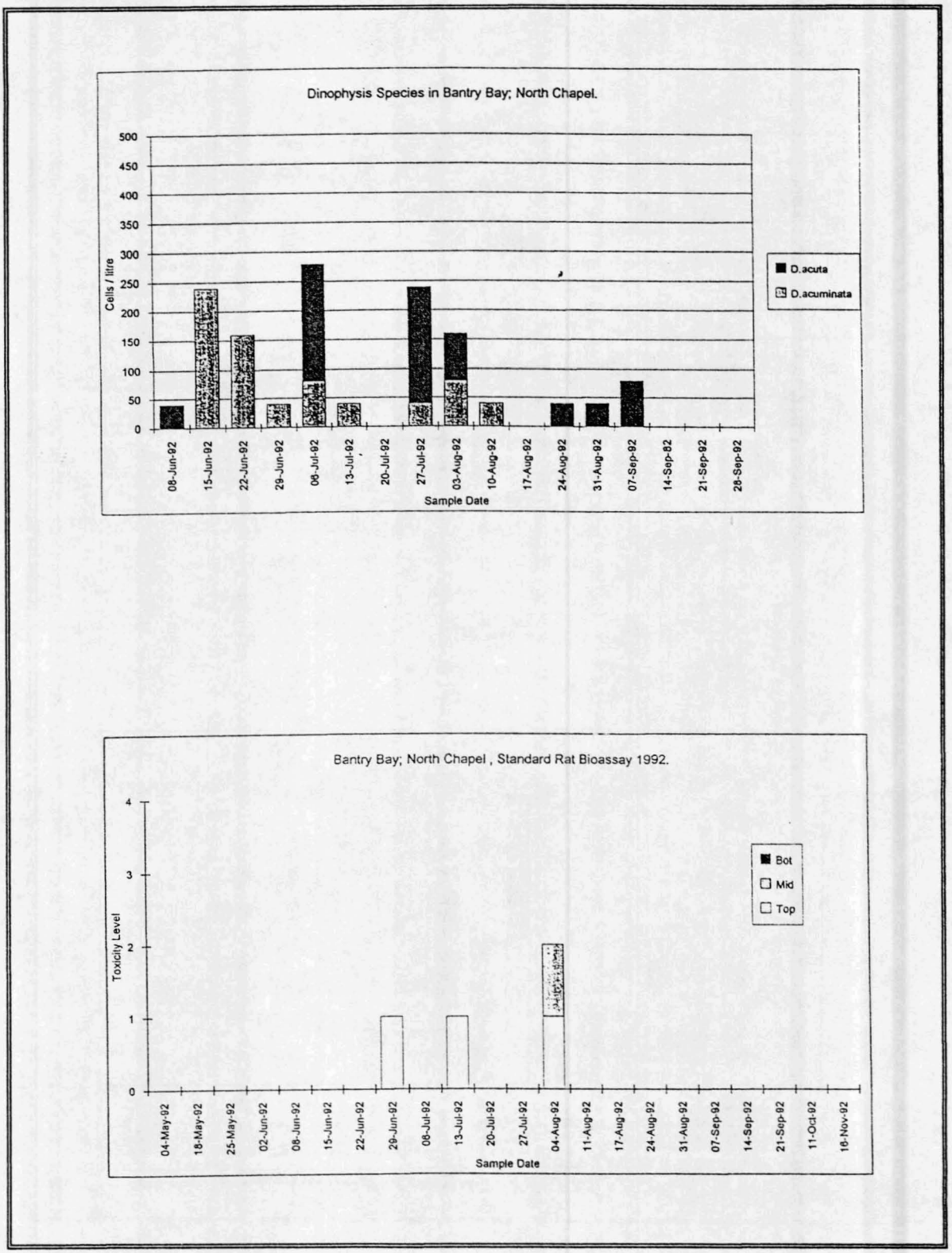


Figure 3b. **Dinophysis and DSP Toxicity in Bantry Bay (North Chapel)**