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The presence of Domoic Acid in *Pseudo-nitzschia* from the Choptank River, a Chesapeake Bay tributary

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Abstract

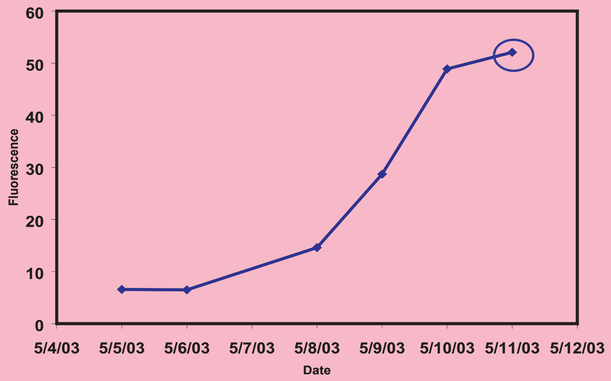
Three clones of *Pseudo-nitzschia* were isolated from the Choptank River, one in November 2002 and two in April 2003. All three clones were tested for domoic acid. Only the November clone was found to be toxic. While the presence of *Pseudo-nitzschia* has been documented in the lower Bay since the early 1980's, this is the first record of toxic *Pseudo-nitzschia* in the Chesapeake Bay area. Historical data suggests that *Pseudo-nitzschia* abundances have been increasing and spreading throughout the Bay from 1998 to 2002.

Introduction

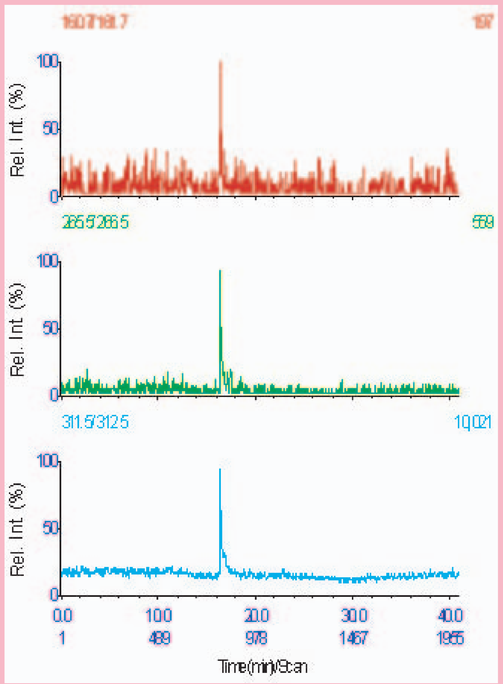
Pseudo-nitzschia spp. are chain -forming diatoms, some of which produce the neurotoxin domoic acid. Domoic acid is responsible for Amnesic Shellfish Poisoning (ASP) in humans and Domoic Acid Poisoning (DAP) in other vertebrates such as cormorants and sea lions. Between 2000 -2002, 50% of the water samples from the Chesapeake Bay area containing *Pseudo-nitzschia* had concentrations above levels requiring mandatory testing of shellfish meats in Denmark and New Zealand. No known toxic events have occurred in Maryland, but if the recent increase in *Pseudo-nitzschia* abundance continues, it could pose problems in the future considering oyster restoration efforts in the Bay.

Positive domoic acid detection in *Pseudo-nitzschia* isolated from the Choptank River

TEMs of culture Pn-1, *P. multiseries*, isolated from the Choptank River in November 2002. This clone produces Domoic acid (DA).



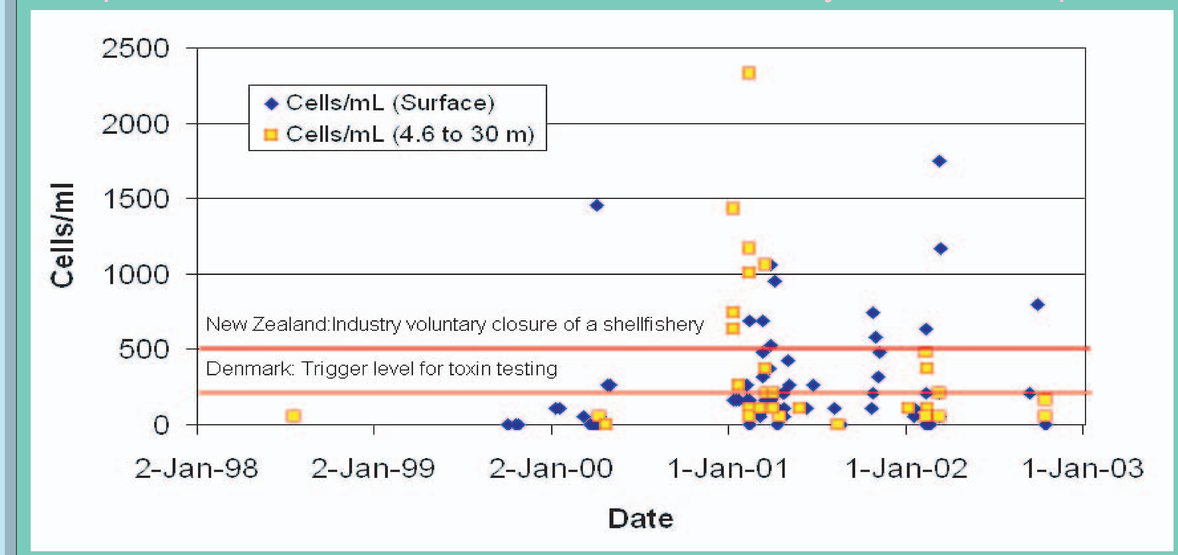
Growth curve for Pn-1. Blue circle indicates date of toxin sample. This clone produced 0.4 pgDA•cell.



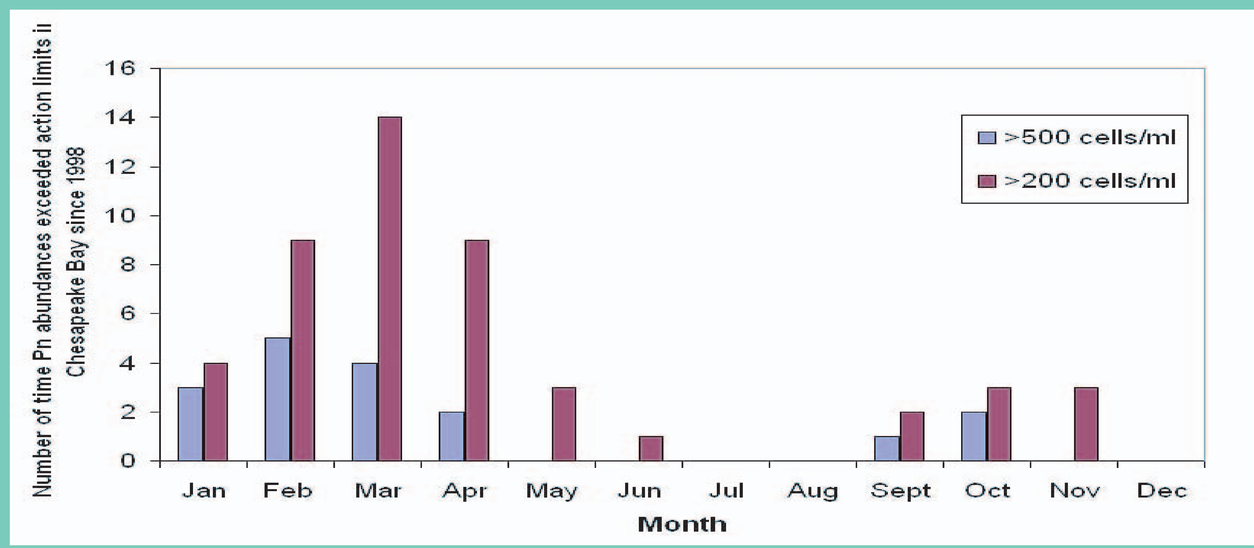
Mass spec of domoic acid from Pn-1. Bottom trace is parent ion of DA at 312 m/z. Top two traces are daughter ions at 266 m/z and 166m/z.

Five more clones of *Pseudo-nitzschia* have been isolated from the Chesapeake Bay area (Bay proper, Patuxent River, and Choptank River) and are pending analysis.

Temporal distribution of *Pseudo-nitzschia* in Maryland's Chesapeake Bay



Abundances of *Pseudo-nitzschia* from 1998 to 2003. Increase in Pn could be due to persistent drought conditions throughout bay region from 1997 to 2002, temporarily increasing salinity. More data is needed to determine if this is a real increase in distribution and abundance.



Number of times *Pseudo-nitzschia* abundances exceeded action limits for triggering toxin testing of shellfish in Denmark (>200 cells/mL) and voluntary closure of shellfish beds in New Zealand (>500 cells/mL) by month for *Pseudo-nitzschia* densities in Chesapeake Bay from 1998 to 2002.

*Data are from DNR sampling stations located throughout the Bay area

Acknowledgements

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