
Communications

**The first observed bloom
of the diatom *Dactyliosolen
fragilissimus* (Bergon)
Hasle 1996 in the Gulf of
Gdańsk***

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KEYWORDS

Dactyliosolen fragilissimus
Bloom
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Abstract

The diatom *Dactyliosolen fragilissimus* (Bergon) Hasle 1996 (syn. *Rhizosolenia fragilissima* Bergon 1903) occurs in the western Baltic Sea predominantly in summer, sometimes forming blooms. In autumn 2005, numerous *D. fragilissimus* cells were observed for the first time in the coastal waters of the Gulf of Gdańsk. In November 2005 a bloom was formed: at its peak, the diatom count was 1.1×10^6 cells dm^{-3} and its biomass was 8.9 mg dm^{-3} .

The diatom genus *Dactyliosolen* belongs to the order Rhizosoleniales and is represented by 6 exclusively marine species (meso- and polyhaline water) (Halse & Syvertsen 1996, Barnard et al. 2004). The species *Dactyliosolen fragilissimus* is the only member of this genus in the Baltic Sea (Hällfors 2004). It has been reported from the Belt Sea area, the Arkona Basin and the Mecklenburg Bight (Wasmund et al. 1999, 2000, 2001). Routine investigations of phytoplankton in the Gulf of Gdańsk in the autumn of

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2005 revealed the occurrence of *Dactyliosolen fragilissimus* in the coastal waters of this basin.

Water samples were collected in the Gulf of Gdańsk from the surface water layer at the end of the Sopot pier between September and December 2005. The sample material was immediately preserved with acid Lugol's solution, then examined under an inverted microscope with a sedimentation chamber in accordance with the method described by Utermöhl (1958). Counts of the phytoplankton and determination of its biomass were carried out in accordance with BMB guidelines (Edler (ed.) 1979, HELCOM 1997). The temperature of the water was recorded in situ; the salinity and pH were measured in the laboratory.

Cells of *D. fragilissimus* (Fig. 1) were identified for the first time in phytoplankton samples collected in the sea water off the Sopot pier on 4 October 2005. From 8 to 15 November, an intense bloom of this species occurred: cell numbers varied between 764×10^3 and 1060×10^3 cells dm^{-3} (Fig. 2), and the biomass ranged from 6.4 to 8.9 mg dm^{-3} . This diatom was present in these waters until 12 December 2005.



Fig. 1. *Dactyliosolen fragilissimus* bloom off the Sopot pier in autumn 2005 (photo: M. Łotocka)

Morphometric analysis of this natural *D. fragilissimus* population revealed a considerable variability in cell sizes: diameters ranged from 9 to

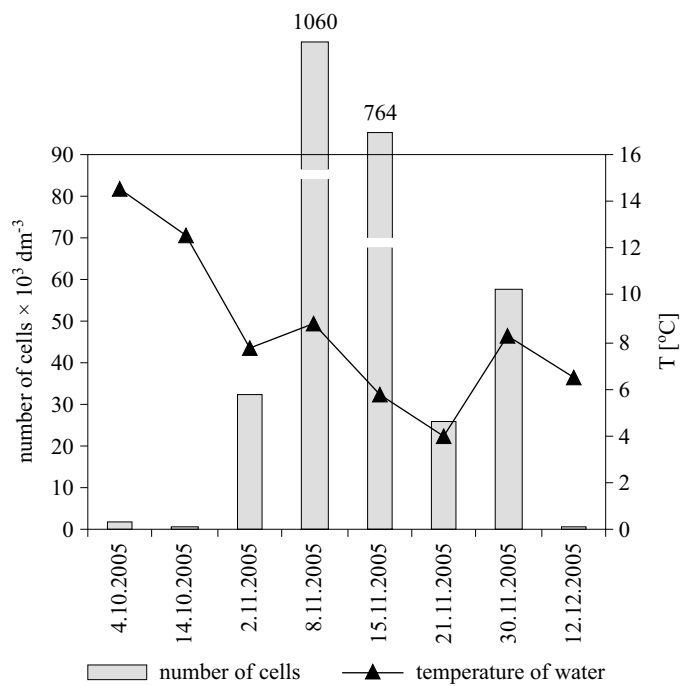


Fig. 2. Cell numbers of *Dactyliosolen fragilissimus* off the Sopot pier in 2005

18 μm , lengths from 27 to 72 μm (Fig. 3). Calculated cell volumes ranged from 2000 to 17 000 μm^3 . Diatoms with volumes from 5000 to 11 000 μm^3 were the most abundant (62% frequency) (Fig. 4).



Fig. 3. Variability in cell size in a natural population of *Dactyliosolen fragilissimus* during the autumn bloom in the Gulf of Gdańsk in 2005

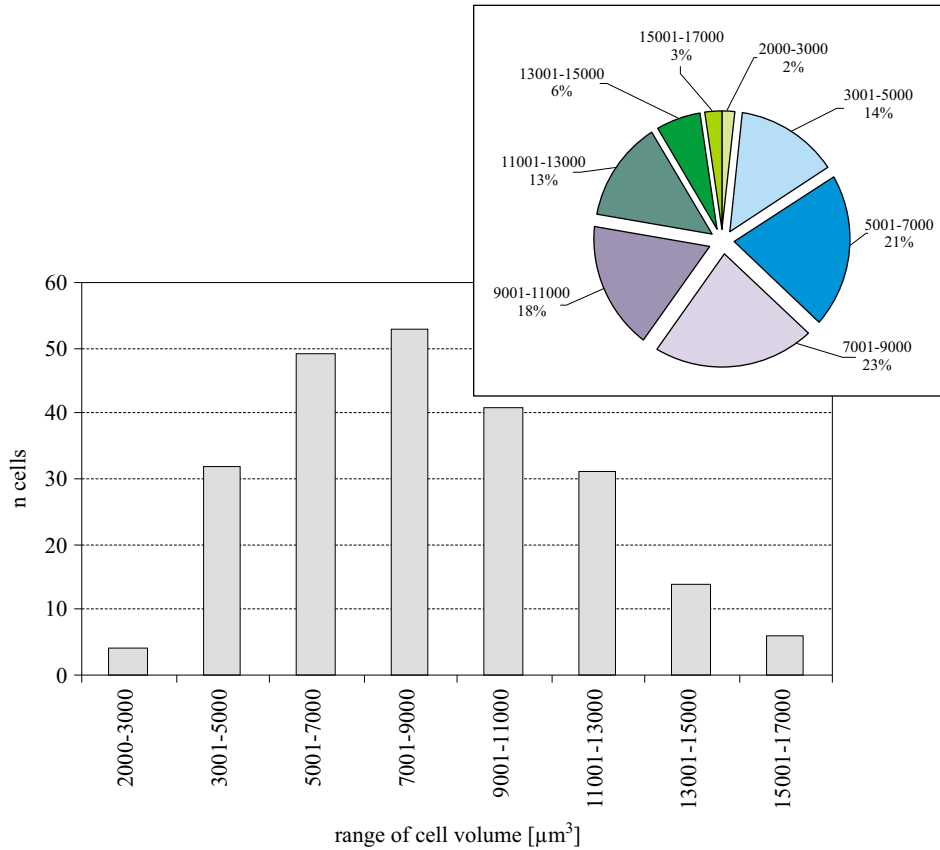


Fig. 4. Volume of *Dactyliosolen fragilissimus* cells off the Sopot pier during the autumn 2005 bloom

The hydrological parameters of the surface water layer during the period of observation: pH 7.8–8.5, salinity 6.8–7.2 PSU, temperature 4.0–14.5°C.

The first unpublished reports on the occurrence of *D. fragilissimus* in the Gulf of Gdańsk come from October 2001, when the abundance of this species ranged from 6 to 45.8×10^3 cells dm^{-3} (B. Witek, unpublished data). During the next four years, this diatom was not recorded in these waters. In the autumn of 2005, highly abundant *D. fragilissimus* replaced the bloom of *Coscinodiscus granii*, another diatom typical of this period (Cyzdik et al. 1995, Żmijewska et al. 2000). The mechanism by which *D. fragilissimus* entered the coastal waters of the Gulf of Gdańsk from the western Baltic remains unclear. Ballast water discharge could have been one point of origin, but the simultaneous occurrence of this species in Lithuanian coastal waters appears to invalidate such a hypothesis. I. Olenina (unpublished data) found *D. fragilissimus* along with *Cerataulina pelagica* and *Chaetoceros*

brevis in Lithuanian waters in early November 2005. The total density of these species was 0.5×10^6 cells dm^{-3} , and their biomass amounted to 3.8 mg dm^{-3} . These are 'new' phytoplankton species in this area (I. Olenina, unpublished data).

It seems more probable that these species penetrated the Baltic Proper with inflow water from the Kattegat-Öresund area. This hypothesis was confirmed by Nausch et al. (2006), who observed such an inflow in October and November 2005. This suggests that warm, low-density water is transported in the surface layer over long distances, even as far as the southern Baltic. Together with other factors, such a phenomenon may have long- and short-term effects on the phytoplankton structure of the Gulf of Gdańsk (Wasmund et al. 1998, Wasmund & Uhlig 2003). This, in turn, may presage further changes in the populations of the various trophic levels in this basin.

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