

PSELIODINIUM VAUBANII – AN ORGANISM INTRODUCED INTO THE ADRIATIC SEA BY BALLAST WATERS?

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Abstract

The dinoflagellate *Pseliodinium vaubanii* was first recorded from the Adriatic Sea in the vicinity of the River Po estuary, in 1978. Subsequently it was recorded from a number of bays and estuaries along the eastern Adriatic coast. It is assumed that *Pseliodinium vaubanii* was introduced into the Adriatic Sea with ballast waters. Even though the studies of Jacques and Soyer (2) showed this species to occur under vertically stable conditions of the water column, we recorded it under conditions of markedly non-homogeneous water column.

Keywords: *Pseliodinium vaubanii*, Adriatic, ballast waters

Material and methods

The phytoplankton communities near shellfish farms along the eastern Adriatic coast were analysed over one year (August 2002 through August 2003). The samples were collected from surface and bottom layers by Niskin bottles and plankton net (mesh size 20 µm) at monthly intervals. The temperature and salinity were measured by YSI-63 CTD sonde. The phytoplankton community was identified using Olympus IX 50 inverted microscope (3). *Pseliodinium vaubanii* was common in our samples. We analysed the environmental conditions under which this species occurs.

Introduction

Pseliodinium vaubanii is first described by Sournia (4) from Nosy-Be, Madagascar. It was first recorded in the Mediterranean in the Gulf of Lion (2). In the Adriatic Sea the species was first recorded from the vicinity of the Po estuary in the northwestern Adriatic (the largest number of ships from all over the world take this route), and subsequently from the Šibenik harbour in the River Krka estuary, from Ploče harbour near the River Neretva estuary and from Kaštela Bay near the Jadro River estuary (1).

Results and discussion

Even though the species is widely distributed over all the Adriatic coastal waters, its abundance is markedly low everywhere.

The phytoplankton of the Adriatic Sea, particularly of its northern and central parts, has been well studied. Therefore it could hardly be assumed that a conspicuous species such as *Pseliodinium vaubanii* could be overlooked. Because *P. vaubanii* was reported from harbours, with an increased eutrophication level, due primarily to river run-offs and human activities, we assume it is an alien species. It is known to occur at the bottom of homogenous water column, with salinities 37.65 to 38.20 psu, and assuming that temperature below 15° C could be a limiting factor (2).

Our records show that *P. vaubanii* may occur in markedly non-homogeneous water column, even though all the records refer to bottom layers with considerably more stable conditions. As to the salinity range, our results mostly agree with those of Jacques and

Soyer, even though both slightly higher and slightly lower salinities were recorded on several occasions (Tab 1), however the species may have a considerably broader temperature range. On several occasions the temperature was much lower than 15° C (Tab 1), which may be indicative of the fact that salinity is more crucial for this species than temperature. This has also been confirmed by the fact that, irrespective of temperature, this organism, almost as a rule, occurs in bottom layers which have typically maritime salinity, as compared to the brackish surface layers.

Pseliodinium vaubanii seems to prefer eutrophic environments, having settled in the eutrophic eastern Adriatic coast, regardless of whether the eutrophication is of natural or anthropogenic origin (shellfish farms and harbours).

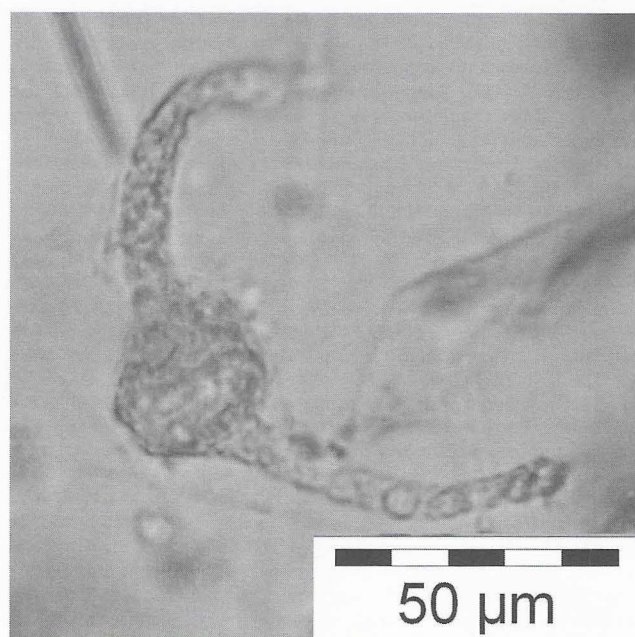


Table 1. Temperature and salinity values at the investigated stations.

MONTH	SITE	Temperature (°C)		Salinity (psu)	
		Surface	Bottom	Surface	Bottom
Aug. 2002	Kastela	24,1	18,6	36,9	38,5
Nov. 2002	Sibenik1	16,2	19,8	11,2	38,4
	Sibenik2	16,0	19,2	10,7	38,5
	Bistrina	15,4	17,4	36,3	37,5
Feb. 2003	Sibenik2	6,8	13,2	13,6	38,2
March 2003	Peruzula	11,5	9,6	25,4	38,1
	Usko	10,8	11,5	36,5	37,3
June 2003	Solina	24,5	18,5	38,2	38,1
	Sibenik1	26,0	17,0	21,7	38,6
	Prdelj	26,0	14,9	32,9	38,4
July 2003	Prdelj	26,0	18,3	33,9	36,5
	Solaris	25,7	25,6	38,7	38,7
August 2003	Sibenik2	24,6	18,8	33,1	38,3
	Sibenik3	24,1	18,3	33,6	38,5
	Peruzula	27,5	23,3	36,3	38,4
	Prdelj	25,8	20,5	35,8	36,7

References

- 1 - Marasovic I., 1983. Records of new phytoplankton species in the Adriatic. *Notes* No 52. : 1-6.
- 2 - Jacques G., and Soyer M., 1977. New observations on *Pseliodinium vaubanii* (Sournia) a free planktonic dinoflagellate. *Vie Milieu*, A. 27 (1): 83- 90.
- 3 - Utermöhl H., 1958. Zur Vervollkommnung der quantitativen Phytoplankton Methodik. *Mitt. int. Ver. Limnol.*, 9: 1-38.
- 4 - Sournia A., 1973. Une période de poussées phytoplanktoniques près de Nosy-Be (Madagascar) en 1971.I. Espèces rares ou nouvelles du phytoplankton. *Cah. ORSTOM*, sér. Océanogr.,10 (2): 151-159.