

A *PLATYMONAS* BLOOM IN COASTAL WATERS OF JEDDAH, SAUDI ARABIA

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Abstract

A dense green bloom of *Platymonas intermedia* Nasr was observed in coastal waters of Jeddah, Saudi Arabia in close vicinity to the point of discharge of city's sewage with cell counts as high as 38 million cells/l. The species appeared to be first record from the Red Sea area bordering Saudi Arabia

Introduction

Platymonas G.S. West is a green motile unicellular alga belonging to the order Prasinocladales of class Prasinophyceae and division Chlorophyta. It occurs predominantly in marine environment where it inhabits coastal areas polluted with organic matter like domestic sewage, animal excretions, runoff from land etc. (Butcher, 1959; Dawson, 1966; North *et al.*, 1972). It is therefore of common occurrence in tidal pools, marine ditches, back waters, small bays and even in aquaria (Butcher, 1959). Occasionally they grow abundantly making the seawater appear dense green in colour (Dawson, 1966). We also hereby report such a bloom that occurred in the coastal waters of Red Sea off Jeddah, Saudi Arabia.

Methods

Fresh samples were used for identification and microphotography. Samples fixed in formalin were used for counting the cells under an Utermohl's microscope (Plankton microscope), after repeated dilutions of the samples. Temperature was recorded and salinity of seawater measured by a refractometer.

The bloom was observed in south corniche of Jeddah (Fig. 1), a locality very close to the point of discharge of city's sewage (Ghamrawy, 1987) and also not very far from the fisheries (Bangala) and commercial (Islamic Port) harbours. The shore was not protected but it remained shallow for a considerable distance to a few hundred meters and then abruptly became deeper. Coral reefs were common in the shallow area.

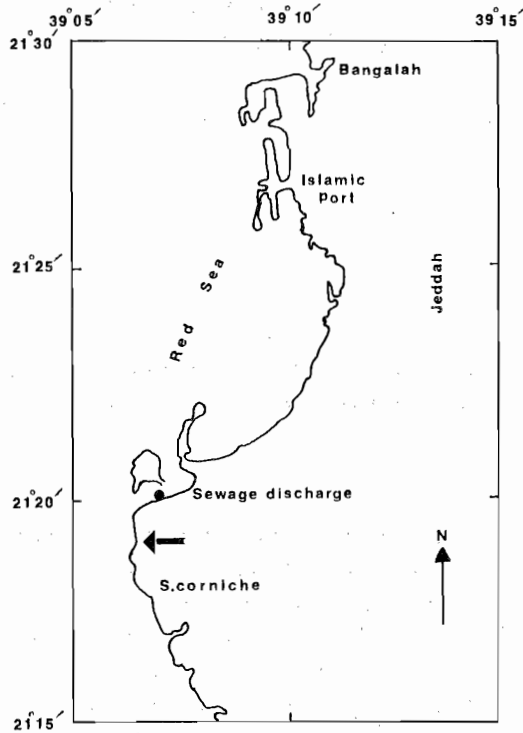


Fig. 1. Map showing the area of study and vicinity. Arrow indicating the site of the bloom (Scale of map, 1: 150,000).

Observations and Discussions

While carrying out a field trip to south corniche of Jeddah on November 22, 1986, it was noticed that the coastal waters extending to several hundred meters in length and width were dark green in colour instead of the normal blue. The green patches or clouds were swarming in very shallow waters close to the upper water mark. However, some 30 to 40 meters and further away from the shore, the intensity of the bloom increased and the water appeared like a dense green soup. Temperature and salinity values recorded were 29°C and 35 parts per thousand, respectively.

Microscopic observations revealed the organisms causing the bloom to be swarms of a green unicellular phytoplankter *Platymonas intermedia* Nasr (Figs. 2 & 3). The cells were broadly ellipsoid to oval in shape with somewhat pointed basal portion in side view and were compressed laterally. They were 13.5 – 27 µm broad showing active locomotion with four flagella inserted at the apical end. They were about the same length as the cell itself and seemed to emerge from an apical depression (Fig. 3a, c). There was a



Fig. 2. *Platymonas intermedia* Nasr (x 1700).

single chlamydomonad type chloroplast with a single large pyrenoid (Fig. 3c). On treatment with 1% iodine solution, the flagellae became detached, the apical notch and the pyrenoids became clearly visible and the protoplast contracted away from the theca (Fig. 3c). Almost all the cells were in vegetative phase except a few which showed straight cell divisions (Fig. 3b).

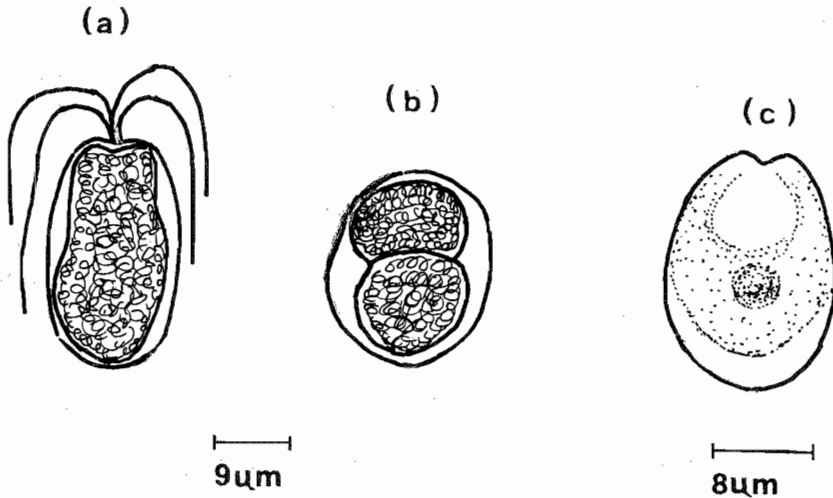


Fig. 3. a) A normal cell. b) Division of protoplast into two daughter cells. c) Cell after treatment with 1% iodine solution

The characters of our specimens did not match significantly with any of the species described by Butcher (1959), Manton & Parke (1965), and Maclachlan & Parke (1967). They resembled closely with *P. intermedia* Nasr (Nasr, 1944) except for the relative larger size of body and flagellae. This species has been reported by Nasr from Gardaga, Egypt, a place more close to Jeddah than any other locality where other species have been recorded. The species resembled the cosmopolitan *P. tetrathele* West closely but differs in not possessing curved basal portion, four lobed chloroplast, and flagella much shorter than the body (Butcher, 1959; Manton & Parke, 1965).

Although many studies have been carried out on marine algae of Saudi Arabia Red sea waters, yet none of them ever reported *Platymonas* from the area. Thus, Papenfuss (1968) who reviewed all the existing literature on Red Sea algae, mentioned only one species *P. intermedia* Nasr from Egypt only (Nasr, 1944). Subsequent studies also did not show existence of *Platymonas* anywhere in Saudi Arabian waters (Mohsen, 1972; Aleem 1978; Dowidar *et al.*, 1978; Khafaji & Meinez, 1984; Khalil *et al.*, 1984; Khoja, 1987). The occurrence of this taxon in Jeddah is, therefore, a new record for Saudi Arabia.

The bloom was overwhelmingly monospecific showing a count of as many as 37,955,600 cells of *P. intermedia* per litre. The other species present were extremely rare and negligible. Green flagellates have been reported to form dense blooms elsewhere as well. Thus Ryther (1954) found huge concentration of *Nannochloris atomus* Butcher, reaching up to more than ten billion cells per litre, in Morisches Bay. Although blooms of *Platymonas* are known to be widespread in the world (Butcher, 1959; Dawson, 1966), they have never been reported from Saudi Arabia waters. Nasr (1944) recorded the species from Gardaga, Egypt, but did not say anything about its abundance.

The cause of the bloom is not known. However, there is a strong evidence that sewage pollution may be the cause of the bloom since most of the domestic sewage of Jeddah city is being discharged very closely to the point of occurrence of the bloom (Fig. 1). Low salinity values of 35 parts per thousand recorded in the otherwise highly saline area (Morcos, 1970), indicates influx of sewage there. Ghamrawy (1987) also reported effects of sewage pollution on marine animals in the same area of corniche. Besides, the area is frequently populated with dense growth of seaweeds like *Enteromorpha intestinalis* Kutz and a giant species of *Ulva*, which are well known to be indicators of sewage pollution (Saifullah & Nizamuddin, 1977; North *et al.*, 1972).

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