



**МОРСЬКИЙ
ЕКОЛОГІЧНИЙ
ЖУРНАЛ**

ЗАМЕТКА

The first description of toxic algae *Heterosigma akashiwo* (Raphidophyceae) near coastal zone of Muscat (Oman) [Первое описание токсичной водоросли *Heterosigma akashiwo* (Raphidophyceae) в прибрежье Муската (Оман). Перший опис токсичної водорості *Heterosigma akashiwo* (Raphidophyceae) у прибережжі Муската (Оман)]. The Sultanate of Oman works toward sustainable development of the country and adaptive management of marine ecosystems, investing in research of marine resources and conservation of biological diversity of the Arabian Sea and the Gulf of Oman. However, in recent decades, frequent “red tides” have become a serious environmental problem, causing mortalities of fish and shellfish, hazards to human health, impairment of water quality, and hence losses to economy and tourism. Most of the ‘red tides’ are caused by harmful microalgae and appearance of toxic species. It is therefore particularly important to continuously monitor the status of the phytoplankton communities in the coastal and marine waters of Oman. Therefore, the complex monitoring investigations of the marine ecosystem are started. Samples from a bathometric depth of 1, 15 and 30 meters down into the Gulf of Oman near Muscat station were collected throughout January of 2014. In all samples, the phytoplankton species *Heterosigma akashiwo* (Y. Hada ex Y. Hara & M. Chihara) was identified. Before now, this species had never been identified or recorded for the region of the Omani Gulf Coast. *H. akashiwo* is a mixotrophic alga, common raphidophycean flagellate, which is frequently present in coastal marine waters. It is known this species has episodically caused problems in fish farming (Thronsen, 1996). However, the mechanism of fish killing remain unknown or partially-described at best and confusing (Rensel, 2007). “The toxins for this species have not identified with certainty, but there is no doubt that *H. akashiwo* kills fish, we just don't know why” (personal message by Øjvind Moestrup). Morphology is highly variable; cells are relatively small, ranging in size from 18 to 34 μm in diameter (Bowers et al., 2006). In samples collected at Muscat station, cell diameter ranged from 12 to 24 μm and from 19 to 31 μm (for long). The biovolume of the cells varied from 579 to 6545 μm^3 and averaged a 2519 μm^3 . The sphericity, based on the degree of deviation from a sphere shape (Bryantseva, 2005), changed from 0.89 to 0.97 and average was 0.92. Maximum abundance at 1 m was $3.9 \cdot 10^3$ cells/L, which is lower than the lethal concentrations of cells which are at $3 \cdot 10^5$ to $7 \cdot 10^5$ cells/L (Rensel, 2007). Abundance on the other horizons was significantly lower, only 128 and 131 cells/L respectively. Biomass at 1 m was nearly $10 \text{ mg} \cdot \text{m}^{-3}$. The water temperature was 23.5°C and salinity – 36.4 ‰. It is known that the optimal growth and very low toxicity are present at 25°C, while maximum toxicity occurs at 20°C (Ono, et al., 2000). *H. akashiwo* has been discovered and recorded in coastal, brackish water, the Pacific and Atlantic oceans (Identification..., 1997), near Kuwait coastal zones (Al-Kandari et al., 2009) and the Black Sea shores of Bulgaria and Russia (<http://phyto.bss.ibss.org.ua>). Since *H. akashiwo* produces cysts at a resting stage and cyst germination leads to large-scale blooms, the aforementioned observations need to be made (Rensel, 2007). **N. M. Al-Abri**, Head of Ecology section (Marine Science & Fisheries Center of Ministry Agriculture & Fisheries wealth, Muscat, Oman), **Yu. V. Bryantseva**, Ph.D., senior researcher (Institute of Biology of the southern Seas, NAS Ukraine, Sevastopol, Ukraine). **Acknowledgments.** Great thanks to Dr. V. Velikova, Prof. Yu. Okolodkov, Prof. Tomas Carmelo and Øjvind Moestrup for the help us.



Fig. 1 *Heterosigma akashiwo* cells in Omani waters (Muscat) in January 2014. Last photo by R.C. Tomas, UNCW, USA.
Рис. 1 Клетки *Heterosigma akashiwo* из вод Омана (Мускат), январь 2014 г. (последний снимок R.C. Tomas, UNCW, USA).