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Occurrence of a new species of toxic Cnidaria (*Pelagia noctiluca* Forskål, 1775) from estuarine waters of Rushikulya River, Western Bay of Bengal

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Introduction

Jellyfish can interfere in the coastal and estuarine ecosystem functioning in many ways. Global warming caused by climate change may be one of the significant reasons for increase in jellyfish population. Besides climate change, eutrophication may favor jellyfish bloom. There are also many important reasons for enhancing jellyfish population such as aquaculture, changes in salinity, introduction of non-native jellyfishes. The organisms such as zooplankton, icthyoplankton are mostly affected by them which indirectly affect fisheries. Jellyfish feeds on the same kinds of prey as adult and young fishes, so if fish are removed from the ecosystem, jellyfish are likely to enrich in number. Dense population may have direct negative effects on human enterprise; specifically, they interfere with tourism by stinging swimmers, fishing by clogging nets, aquaculture by killing fish in net-pens and power plants by clogging cooling-water intake screens. They are sometimes described as the earthquake indicator[1]. In Indian context, focus on jellyfish study is limited[2,3,4,5,6,7,8]. Jellyfish bloom together with overfishing may lead to decline fish yield.

There is no doubt, the ocean researchers come across the jellyfish bloom events during their field samplings, but hardly report and publish, the fact may be that they are either concentrating in their respective project objectives or neglecting to publish such events[9]. However, in anticipation of adverse impacts of toxic cnidaria on coastal water quality and productivity, the authors tried to highlight the event to attract the scientists to make further research.

Materials and Methods

The Rushikulya estuary is a shallow and semidiurnal type of estuary situated at about 15 Km north of Gopalpur. It locates between Lat. 19° 22' - 19° 24' N and Long. 85° 21' - 85° 5' E along the south Odisha coast (Fig. 1). During the past two decades the estuary drew considerable attention owing to its contribution to capture fishery as well as collection of shrimp seeds for culture. Besides this, the estuary is internationally recognized as Rushikulya rookery for mass nesting of vulnerable Olive Ridley (*Lepidochelys olivacea*) sea turtles.

During regular field survey (November, 2012-February 2013), jellyfish congregations were observed in Rushikulya estuary and adjacent coastal waters.

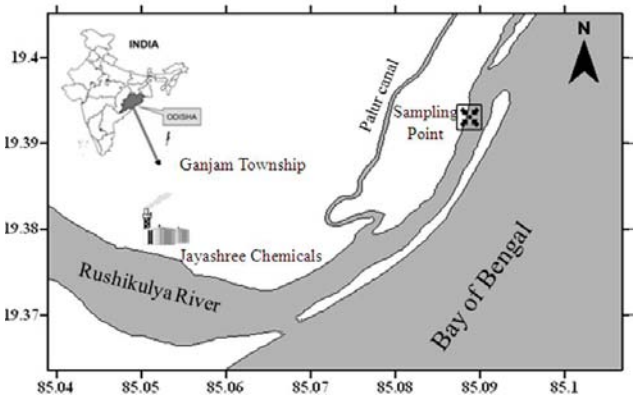

Fig. 1— Location of sampling point in the study area

The probable reason for jellyfish congregation in this area has been recently described by Sahu and

Panigrahy (2013)[8]. During this spectacular bloom, some species of jellyfish were observed in abundant manner with a beautiful pink patchy view in the estuarine waters of Rushikulya River. Number of individuals observed during different months is presented in Table 1.

Table 1 Abundance of *Pelagia noctiluca* during Nov-12 to Feb-13 in the study area

Month	*Pelagia noctiluca* (nos./10m^2)
November-2012	4
December-2012	7
January-2013	2
February-2013	1

Species were caught in zooplankton net of mesh size 300µ by horizontal hauling. The collected material was then undergone the process of identification up to the species level and identified as *Pelagia noctiluca* (Fig. 2).

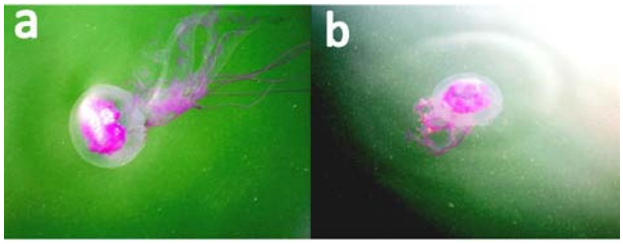

Fig. 2— *Pelagia noctiluca* in the study area (a) lateral view (b) nadir view

The kind of classification, the species follows is: Animalia (Kingdom) > Cnidaria (Phylum) > Scyphozoa (Class) > Discomedusae (Subclass) > Semaeostomeae (Order) > Pelagiidae (Family) > Pelagia (Genus) > *Pelagia noctiluca* (Species).

Results and Discussion

Pelagia noctiluca is widely distributed and is typically an offshore species, although sometimes it is washed near the coastlines and may be stranded in great numbers on beaches. Environmental factors may directly affect the size and timing of *Pelagia noctiluca* populations. It has the ability to bioluminesce. From the toxicity point of view, it is an important one. Its unpleasant and dangerous sting may have indirect effect on tourism and its proliferation may also interfere in coastal dragnet fishing. In France, this abnormal abundance of this species prompted for implementation of a national long term (1981-2008) monitoring program on Mediterranean coasts[10]. Around the globe there are many reports on the severe stinging events by *Pelagia noctiluca*[11,12]. They are mostly responsible for causing local symptoms to humans, such as pain, erythema, edema and vesicles. This jellyfish is able to restore its stinging capacity after only a few days following nematocyst liberation[13]. Cases of anaphylaxis post-envenomation with *Pelagia noctiluca* have also been reported[14]. Sea water and ice packs appear to be the most appropriate management of stings from this species, whereas vinegar should be avoided, as it triggers nematocyst discharge[15,16]. Research on biological cycle, reproductive cycle, gastrovascular content analysis, behavior study, trophic ecology, protein analyses, trace elements analyses, toxicity of *Pelagia noctiluca* has been carried out in different parts of the world. But still a great deal of knowledge remains unknown in terms of toxicity, ecology and several other aspects which need to be clarified and help to explain its complex role in aquatic environment.

This congregation of jellyfish may be due to wind-current-tide action, natural or cyclic fluctuations of jellyfish populations, water movements, environmental factors, water pollution, and climate change. Jellyfish is a favorite food for Olive Ridley sea turtles. From among the few most favorite jellyfish species as diet of Olive Ridley turtles, *Pelagia noctiluca* is an important one.

It is important to monitor the swarming of *Pelagia noctiluca* in aquatic environments. This can be done with creation of continuous database on numerical population density of *Pelagia noctiluca* and its further coorelation with environmental variables and anthropogenic influences. Along with the continuous monitoring programme, future research on jellyfish and fishes should be carried out together to derive clear understanding regarding jellyfish impact on fisheries. Worldwide, very limited studies have undertaken regarding the consumption of jellyfishes by fishes and sea turtles[17,18]. So attention should be given to such studies which can provide information regarding the consumption of jellyfish by top predators. From the toxicological point of view, it is very important to explain how venom acts against cells and clarify the mechanisms which damage biomembranes and alter membrane permeability. Epidemiological study can be encouraged to identify the areas at risk due to jellyfish

blooms. Such an exercise can only give the complete idea about the ecology and toxicity of *Pelagia noctiluca* and their effect on different aquatic organisms *viz.* zooplankton, icthyoplankton, fishes and larger organisms like Olive Ridley sea turtles. Besides, models need to be developed by using climate indices and environmental data to understand how climate variables effect *Pelagia noctiluca* population.

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