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### Abstract

Environmental diseases in aquaculture play a crucial role in the industry, so that it is imperative to acquaint different aspects of environmental factors. Acquiring the knowledge (i.e. what are these factors, how we can evaluate and measure it in the field, how we can manage these factors and overcome its sequelae) will enhance and maximize the net profit of the fish crop. The main outlines of this course are introducing major environmental diseases in fish and shrimp farms, diagnosis and management of these diseases. Moreover, emphasis on the use of different species of fishes as indicators for pollutants will be addressed. Another important recent notion is to use transgenic zebra fish as an indicator for water pollution. Engineered fish expressed fluorescent proteins under the control of different inducible gene promoters. Stress responsive promoters were used to detect environmental heavy metals/toxins. Also, zebra fish embryo was used to assess water quality in lakes as biomarker for stress protein response and toxicity. Cytochrome P450 1A (CYP1A) as a potential biomarker for water pollutants has received attention recently in fish.

Ecosystems are currently undergoing rapid rates of change, which have the potential to inflict severe damage on the health of marine mammals. Increases in anthropogenic or natural toxins (from algal blooms) in coastal habitats are of concern not only for marine mammals but also for humans. For example, lingual papillomas, squamous cell carcinomas, and genital papillomas in both free-ranging and captive Atlantic bottlenose dolphins (*Tursiops truncatus*) will be addressed. Harmful algal blooms (HABs) produce potent neurotoxins that may lead to mass die-offs of marine mammals such as dolphins, sea lions, and manatees. Some marine mammal species prove to be good sentinels for the public health effects of HABs. For instance, several recent epizootics involving endangered Florida manatees and Atlantic bottlenose dolphins were associated with brevetoxins, which are produced by the dinoflagellate *Karenia brevis* that gives rise to Florida red tides. The diagnosis of brevetoxicosis is typically by exclusion and may be based on detecting toxins in fluids and tissues and by pathologic findings, such as immunohistochemical staining to verify the presence, abundance, and distribution of brevetoxins in tissues. The course will focus also on environmental diseases in marine mammals such as corneal ulcer, swallowing of foreign bodies, gastrointestinal ulcers, trauma, neoplasms, and oil exposure. The impact of giving such information to young scientist deal with marine mammals will help them identify, diagnose, and manage these diseases to reduce/minimize the incidence of these diseases in the ecosystem. These objectives will be achieved via lecturer using power point. This course is intended for students with a biology background and/or those are preparing for their M.S. degree.

### Course objectives

- To understand the major water quality parameters, where fishes and shrimp lives.
- To emphasize on major environmental diseases in aquaculture.
- To acquire different methods of diagnosis of these diseases.
- To manage these diseases in the ponds, aquaria, and tanks
- To address some common encountered environmental diseases in marine mammals.

### Course level

Introductory

### Note

Participants should bring their own laptop in order to follow this course.