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Current Situation and Protection of the Diversity of China's Marine Life

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Abstract

The diversity of marine life plays an important part in that of global creatures. This article elaborates on the current situation and application of China's marine ecosystem, analyzes the main causes for the threats to China's marine life diversity, sums up China's achievements in protecting the diversity of its marine life and puts forward some protective countermeasures based on the reality.

Keywords: Ocean, Creature diversity, Economy, Development

The ocean is a cornucopia of marine life diversity, which is mainly manifested in marine life resources. As renewable resources, marine life can provide vast wealth for human beings in nutrition, health, medicine and so on because it is not only an important source of food but has important medical values. China has a large area of oceans as well as a long coastal line, hence having world reputation for its diversified marine life (Chen, 1994). Here, the protection of marine life diversity refers to that of biological resources and human living environment.

1. Current Situation of the Diversity of China's Marine Life

Here the diversity of marine life refers to the variety, changeability of marine life as well as the complexity of their habitats. According to intrasystem biological group structure and functional characteristics, it can be divided into three layers including species diversity, genetic diversity and ecological diversity. It mainly involves issues such as rich functions, species diversity and the stability of species groups as well as the whole ecosystem, regional biological geography and richness in regions and the influences human activities and environmental degradation have on biological group structure (Zhu, 1994).

1.1 Genetic Diversity of Marine Life

Genetic diversity provides a basis for evolution and adaptation. Generally, the richer genetic diversity is, the stronger the adaptability of species to the environment will be. Marine life has greater genetic diversity than terrestrial life and 5% to 15% of genetic series in many marine species are hybrid. The ultimate goal of our genetic diversity research is to make use of its gene bank in two ways: one is an application without modification and the other is one with modification. In spite of the differences in the application and system of gene banks, they have a common goal, that is, to improve the objective appearances of wild economic animals and provide objective genes for this improvement (Zhang, 1993).

Although China hasn't conducted its research on the genetic diversity of marine life for a long time, it has achieved rapid progress. An ultimate way of this research will be an analysis on DNA nucleotide sequence. In late 1980s, scientists began to switch their attention to a research on mtDNA, which is easier to be detached from nuclear DNA and be purified. In addition it will not be recomposed because it is maternally inherited; its evolution pace is 5 to 10 times faster than single-copy DNA. As a result, further achievements have been made in the research on mtDNA in China (Zhang, 1993). Besides, the research of genetic variation of marine life molecules plays an important role in explaining group differentiation and identifying the rules of species evolution as well as genetic breeding.

1.2 Species Diversity of Marine Life

China has an ocean area of $3*10^{6}km^{2}$, hence a considerable variety of marine species. As recorded, China has 20278

species belonging to 44 classes. Besides, China has some marine species native to it or some rare species.

1.3 Ecological Diversity of Marine Life

The complexity of ocean environment leads to a splendid marine ecosystem, which is divided into coastal wetland ecosystem, coral reef ecosystem, upstream ecosystem and deep sea ecosystem. Among these, the coral reef ecosystem in South Sea is called "Tropical Forest in Ocean". Most of the coral reef there is reef-building coral, having a rich variety of life forms, including poriferan, coelenterate, mollusc, crustacean and echinoderm, which make up a complex and fragile ecosystem.

2. Threats to the Diversity of China's Marine Life

The ocean provides our human beings with rich resources and favorable natural conditions for the sustainable development of human social economy. However, human beings have destroyed the ocean environment consciously or unconsciously when exploiting nature. Currently, the ocean, as a huge ecosystem, is suffering from an unprecedented ecological and genetic stress. The impacts of human activities on marine life diversity in genetics, species, ecology are mainly manifested in fishery, mariculture, pollution and eutrophy, invasion and the destruction of living environment.

The snapper, for which China's offing is most famous, had an annual production of 1000 to 2000 tons in 1930s and 1940s. Later, however, with the intensive fishing of both domestic and foreign fishing boats, the resource was severely destroyed and it is quite difficult to find them nowadays. What's worse, an important species, Chinese prawn, which had a production of over 4000 tons in 1979, has only more than 100 tons now.

2.1 The Influences of Fishery on Marine Life Diversity

Due to the present rapidly-increasing fishing boats and improving fishing methods, fishing resources have been reduced or even exhausted now and many high-quality species have no fishing season any longer. Besides, wasteful fishing and by-products from fishing have destroyed many kinds of rare marine life. Some fishing methods, such as using trawling nets, poisoning fish and exploding fish, have severe influences on the marine ecosystem.

2.2 The Influences of Mariculture on Marine Life Diversity

China's mariculture industry has a long history, in which the large-scale, perfectly-managed mariculture system has eased the stress for wild species. However, it has also influenced the shallow ocean ecosystem, such as its species structure, food chain and local nutrition import.

2.3 The Influences of Pollution and Eutrophy on Marine Life Diversity

Chemical pollution is mainly caused by the discharge of land-sourced pollutants, the exploitation of oil in the ocean as well as the leaking of oil during being shipped. Pollutants may poison or hurt marine life, influence their normal reproduction or cause negative genetic mutation. A more direct and serious result from chemical pollution will be the eutrophication of ocean water, which will lead to red tide ultimately.

2.4 The Influences of Species Invasion on Marine Life Diversity

Human exploitation in the ocean may introduce some new species consciously or unconsciously, which are called foreign species. Accordingly, their settling down activities are called ecological invasion (IMAI.I, 1999), which will influence the local marine ecosystem and may cause the extinction of some former species.

2.5 The Influences of the Destruction of Living Environment on Marine Life Diversity

Some destructive activities, such as enclosing tidal flats for cultivation, reclaiming land from water areas, some ocean or coastal projects, artificial constructions, channel dredging, may disturb the normal activities of marine life to a small degree (e.g. a 2/3 reduction of China's red forest area caused by reclaiming land from water areas) or even the complete loss of the marine life living environment.

3. Protection of the Diversity of Marine Life

3.1 Improving the Sense to Protect Marine Life Diversity and Controlling Resource Utilization Intensity

Due to the present common shortage of knowledge about biological diversity, scientific, technological and institutional capacities should be made use of to provide a basic understanding. Besides, some mass media can be employed to publicize it or include some relevant issues into education program. All people including women and children, especially leaders at all levels, should realize that the ocean is a huge resource cornucopia. Although all countries around the world are competing to develop marine resources, they will be exhausted some day.

3.2 Establishing and Perfecting Policies, Regulations and National Strategies about the Protection of Marine and Coastal Life

Chinese government has always been putting much importance on protecting marine life diversity. It is the first one to approve *Convention of Biological Diversity*. In addition, as one of signatory nations to *United Nations Convention on*

the Law of the Sea, China resolutely performs its rights and obligations to develop, utilize and maintain the marine life in its ocean areas and the open seas. Chinese government has also established some regulations and action plans for the protection of marine life diversity.

3.3 The Construction of Scientific Investigation Method and Ecological Environment Monitoring System

Currently, China National Bureau of Oceanography has established a national ocean environment monitoring system composed of satellites, planes, boats, buoys and onshore, gaining an array of valuable materials and accomplishments of marine and coastal life diversity. In addition, it has issued over a hundred communiqués, yearbooks and reports on marine environmental quality. In order to monitor the typical marine ecosystem, local ocean administrations at different levels have established many marine environment monitoring stations together with others or just by themselves to conduct their monitoring duties on regional marine environment.

3.4 The Construction and Management of Marine Natural Reserve Areas

China has established a quite perfect marine natural reserve areas system. Currently, there are over 60 areas of this kind constructed and managed by China National Bureau of Oceanography or other relevant departments, in which 18 are national ones. These reserve areas cover all the main marine species in China, hence protecting many rare ones.

3.5 Conducting Integrated Management of Ocean and Land and Improving Marine Environment from the Source

We cannot only dwell on the ocean when we talk about how to protect the diversity of marine life, but find out the source to prevent land-sourced pollutants from pouring into the ocean. In addition, the principle of "the person who makes the construction is expected to treat and compensate for it" should be taken into consideration in all ocean-employed projects to reduce their influences on the environment to the smallest degree.

3.6 Establishing International Coordination System to Maintain Ecological Balance Together

A lot of biological resources are owned by the whole world, so it isn't a nation's business to protect these resources. A nation's biological resources may be affected by the exploitation activities conducted by another nation. Therefore, all nations are expected to have more exchanges about their activities in their ocean areas that may have some negative influences on other nations' biological diversity and to sign some bilateral, regional and multi-lateral agreements accordingly.

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