Marine introduced species in China seas and action plans

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Outline of Presentation

- **Status**
  - Outline of China Seas
  - Marine Introduced Species
  - Marine IAS
- **Needs**
- **Actions**
- **Strategies**

Status—Outline of China Seas

China seas are located in the north-western part of the Pacific Ocean and consist of Bohai Sea, Huanghai (Yellow) Sea, East China Sea and South China Sea, cover three climatic zones(warm-temperate, subtropical and tropical).Diverse habitats is easily influenced by different alien species.

Status—Marine Introduced Species

It is estimated that there are one hundred and thirty-seven marine alien species in China seas.they are introduced by intentional introducing species,such as marine aquaculture and marine aquarium,and unintentional introduction,such as ship hull fouling and ballast water.

Status—Marine Introduced Species

According inadequate statistic, there were

- 10 species of fish,
- 2 species of shrimp,
- 9 species of mollusks,
- 1 species of echinoderm,
- 4 species of alga
- 2 species of halophytic weeds

Status—Marine Introduced Species

Species	Introduction date	Source regions	Recipient regions
Scophthalmus maximus	1992	EU	Shan dong,Liao ning
Sciaenops ocellatus	1991	U.S.A	China coast
Salmo gairdnerri	1983	U.S.A	All China
Anguilla anguilla	1990	EU	South China coast
Fugu rubripes	1991	Japan	North China coast
Orehromis mossambica	1957	vietnam	China coast
Orehromis niloticus	1978	Sudan	China coast
Orehromis aureus	1983	U.S.A	China coast
Morone saxatilis	1990s	U.S.A	South China coast
Lates calcarifer	1990s	Australia	South China coast
Penaeus japonicus	1993	Japan	North China coast
Penaeusvannamei	1988	Ecuador	China coast
Argopecten irradian	1982	U.S.A	North China coast
Patinopecten yessoensis	1980s	Japan	North China coast
Crassostren gigas	1980s	Japan	China coast
Haliotis rufescens	1980s	U.S.A	
Haliotis fulgens	1980s	U.S.A	
Panopea abrupta	1990s	U.S.A	North China coast
Mercernaria mercernaria	1990s	U.S.A	North China coast
Pecten maxima	1990s	EU	coast
Strongylocentratus intermedius	1989	Japan	North China coast
Laminaria japonica	1930	Japan	naturalization
Undaria Pinnatifida	1950s	Japan	naturalization
Macrocystis pyritera	1980s	U.S.A	
Eucheuma dmakusaensis	1984		Guang dong

Status—Marine Introduced Species

Many aquaria have been built over Chinese mainland, in which hundreds of marine ornamental animals and plants were imported and exhibited. For example of Tianjin Aquaria, many species…

Signys vulpinus、 *Parupenus bifasciatas Acanthurus triostegus*、*Acanthurus glaucopareius*、*Acanthurus nigricans* 、*Paracanthurus hepatus*、*Acanthurus olivaceus Pterois volitans*、*Liopropoma aragai*、*Lutjanus fulvus*、*Triakis scyllium*、*Arothron hispids*、 *Gymnothorax reellatus*、 *Arothron stellatus*、 *Pomacentrus coelestis*、*Hemitaurichthys polylepis*、*Balistoldes conspicillus Balistoldes viridescens*、*Callicanthus lituratus*、*Dascyllus aruanus*、*Lactoris diaphana*、*Grammistes sexlineatua*、*Gomphous varius*、*Amphiorion clarkii Priacanthus macrocanthus*、 *Chaetodon ephippius*、*Chaetodon auriga*、*Heterodontus zebr*

Status—Marine Introduced Species

In recent years,sixteen cryptogenic HAB species have been found in China coast sea areas.Perhaps they were introduced by ballast water.

Chattonella marina

Gonyaulax polygramma Stein

Gonyaulax polyedra Stein

Gymnodinium mikimotoi

Phaeocystis sp.

Alexandrium tamarense

Alexandrium catenella

Gymnodinium catenatum

Cochlodinium sp.

Pyrodinium bahamense

Status—Marine Invasive Alien Species

- Up to now, three marine alien species,including *Spartina alterniflora*,*Mytilosis sallei* and *Crepidula onyx* have been definitely found to cause the great damage of ecology and social economy in China coast.

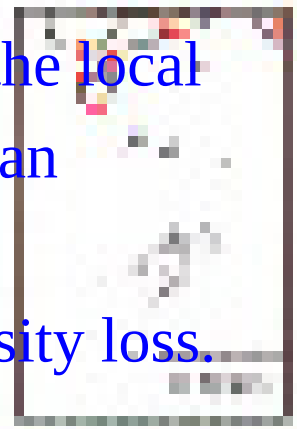
Status—Marine Invasive Alien Species

- *Mytilopsis sallei., looks like small mussel, were found in some semi-closed bays and shallow water in southeast China coast.*
- *They have strong spread ability, and even can grow in very polluted sea water.*
- *They came from tropic sea near south America, now have been common benthos species.*

Status—Marine Invasive Alien Species

Impacts and Distribution of *Mytilosis sallei*

- *Mytilosis sallei* was found in Taiwan in 1977,found in Hongkong in 1980,and firstly found in Xiamen, Fujian province in 1990.
- It often clings to and cover with marine aquaculture facilities such as piscicultural cages,breeding rafts and ropes etc.According to monitoring,the density can reach to 5740~34360 indi./m^2,so it seriously impacts the local marine aquaculture.Moreover, *Mytilosis sallei* can exclude the native species such as *Balanus sp.*,*Crassostrea sp.*etc,and makes local biodiversity loss.



Status—Marine Invasive Alien Species

Distributions and impacts of *Crepidula onyx*

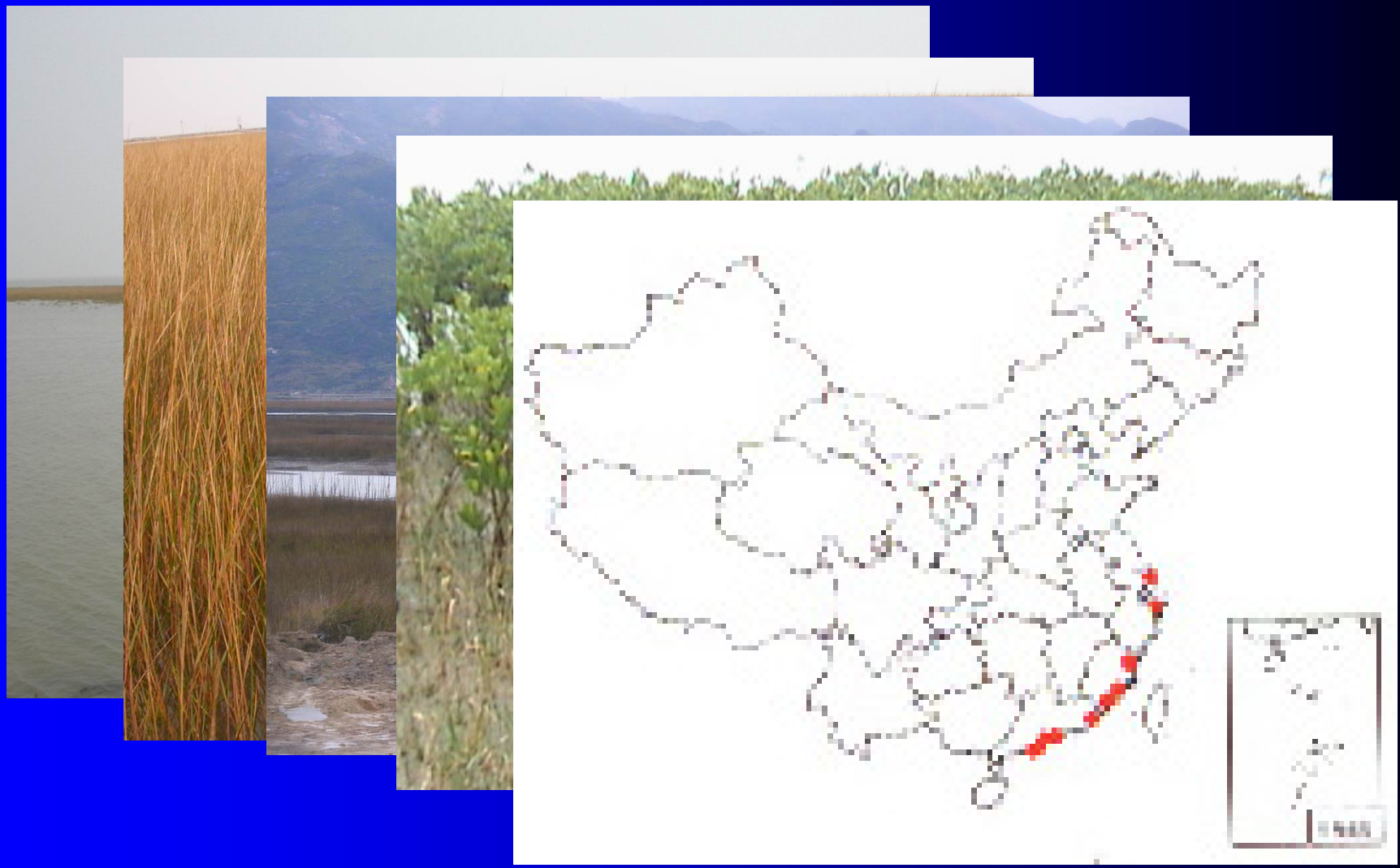
- *Crepidula onyx* was found in Kongkong in 1979.Now it has spread to Guangdong coast.
- It is a dominant species of the fouling organisms,and often adheres to the shell of *Perna viridis* cultured and to piscicultural cages.
- The density can reach to 11~994 indi./m^2.
- Distribution: Guangdong, Hongkong

Status—Marine Invasive Alien Species *Spartina alterniflora* and its impacts

- *Spartina alterniflora* was introduced to protect beach and bank from erosion from England and U.S.A in 1979
- The impacts:
  a. destroying the habitat of inshore organisms ,so as to impact beach breeding;
  b. jamming the navigation way;
  c. impacting seawater exchanging,then causing the degradation of seawater quality,further inducing red tide;
  d. threating the native coast ecosystem,thus bringing on the disappearing of mangrove.

Status—Marine Invasive Alien Species

Spartina alterniflora



Needs

- Investigation technology for marine alien species
- Cooperation among institutions and information sharing.
- Ecological risk assessment technology for intentionally introducing species
- Control technology for marine alien invasive species
- Ecological restoration technology

Actions

- Studied and developed the method to control ***Spartina alterniflora***
- Developed ballast water management strategy
- Carried out introduced species baseline surveys of the port of Dalian (IMO) and expanded it
- Developed introduced regulations and laws

Actions

Will implement an marine introduced species survey project from 2005 to 2009

- Main contents
  - Survey marine introduced species from different vectors
  - Assess ecological risk of marine introduced species
- Main objectives
  - Understand the status of marine introduced species and its disaster in China coast
  - Assess ecological risk of marine introduced species
- Out products
  - Distribution maps and atlas of marine introduced species
  - Set up the method to assess ecological risk of marine introduced species
  - Set up an information system to manage marine introduced species

Development strategies

Chinese government is consistently paying more attention to invasive species. China Ministry of Agriculture was directed to coordinate a country strategy and plan to address the growing environmental and economic threat from invasive species, and to use their authority to prevent the introduction of invasive species and to restore native species.

- **Measures**
  1. Preventing and control system construction
  2. Strengthening basic theory study
  3. Technology development and study
- **Prior development domains**
  1. Investigation on background information of marine alien species
  2. Detecting and controlling of alien species in the ballast water
  3. Ecological risk assessment for intentionally introducing species
  4. Study on invasion mechanism
  5. Invasive disaster assessment and ecological restoration
- **International cooperation**
  1. Investigation on background information of marine alien species
  2. Detecting and controlling of alien species in the ballast water.


Thank You!