

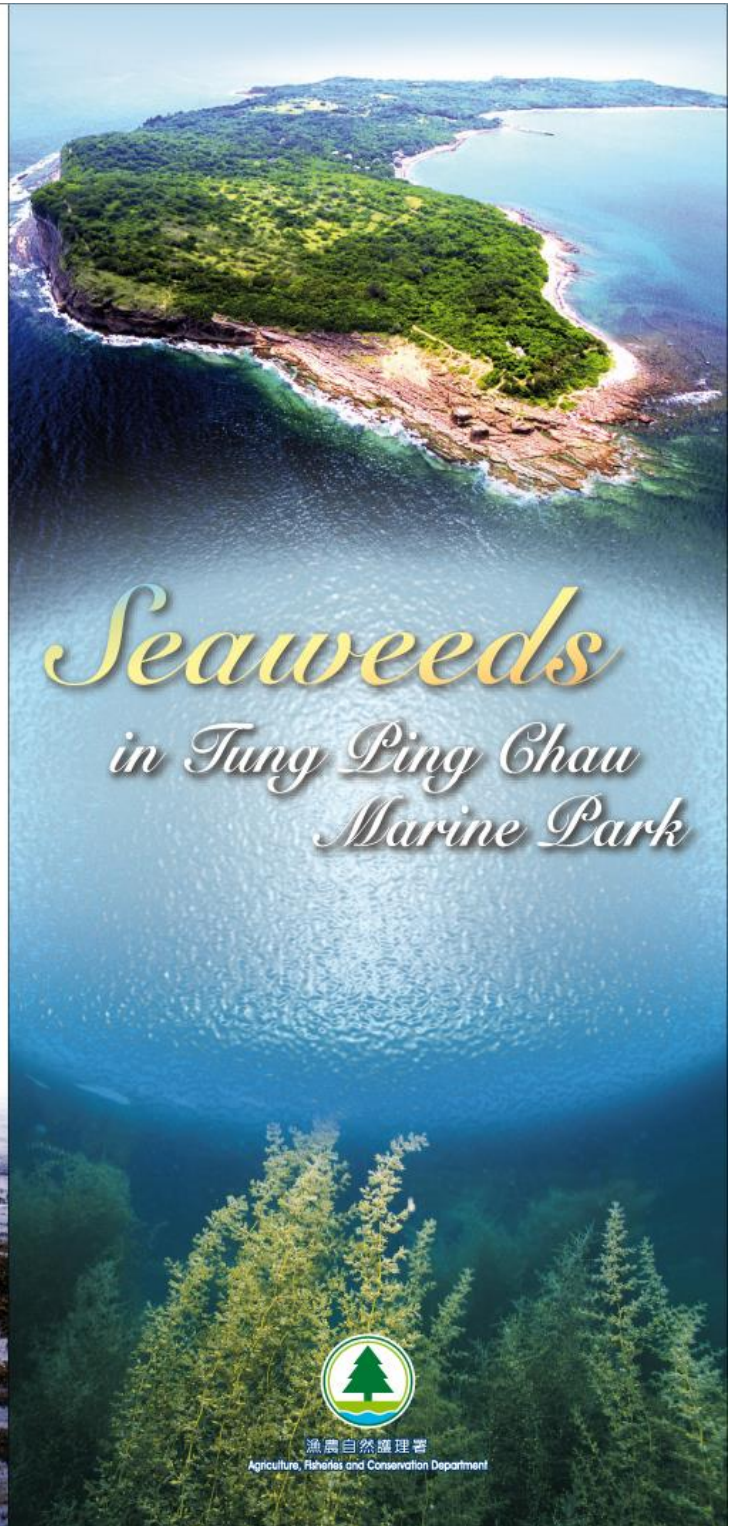
Conservation of seaweed in Tung Ping Chau Marine Park

Tung Ping Chau is a small island in the north-eastern water of Hong Kong. Its surrounding water supports at least 65 species of seaweeds, 200 species of invertebrates (including corals, molluscs, crustaceans among others), and over 130 species of fish. For this reason, Tung Ping Chau was designated as the fourth Marine Park in Hong Kong on 16 November 2001.

Like all other marine lives, seaweeds in Tung Ping Chau Marine Park are protected under the Marine Parks Ordinance (Cap. 476) and Marine Parks and Marine Reserves Regulation (Cap. 476A). Collection and damage of seaweeds inside the marine parks are prohibited. To help us to conserve this important ecological resource, you, your family and friends, are encouraged to follow the code below when visiting Tung Ping Chau Marine Park:

- Do not collect seaweed, both live or dead.
- To record the seaweed sample, just take photos.
- Avoid trampling on seaweed washed up along the shore
- Avoid swaying your fins on the seaweeds when diving.
- Do not pollute the marine water bodies.
- Follow the Marine Parks and Marine Reserves Regulation (Cap 476A) and the Marine Parks Visitors Code.

Biological information on this leaflet is provided by Prof. Put O. Ang, Jr., Erica K.Y. So, Winnie S.Y. Wong and F.F. Yeung, The Chinese University of Hong Kong.



Most people put their attention on the diverse coral communities; affluent marine resources and spectacular coastal geographic features of Tung Ping Chau Marine Park. Actually, they may overlook a group of marine organisms in Tung Ping Chau Marine Park. This group of organisms plays a very important role in the coastal marine ecosystem. Although they are not as colourful as corals nor can they move freely as agile as most coral fishes; their contribution to the marine ecosystem should not be underestimated. This group of marine organism is known as "Seaweed".

This leaflet briefly introduces the general biology and ecology of seaweed, with descriptions on some common seaweeds in Tung Ping Chau Marine Park. Last but not the least, a "Code for visitors" is provided for the reference of the readers to help protect the seaweeds inside the marine park.



Although coral in Tung Ping Chau Marine Park arouse much attention, seaweed plays very important role in the coastal marine ecosystem.

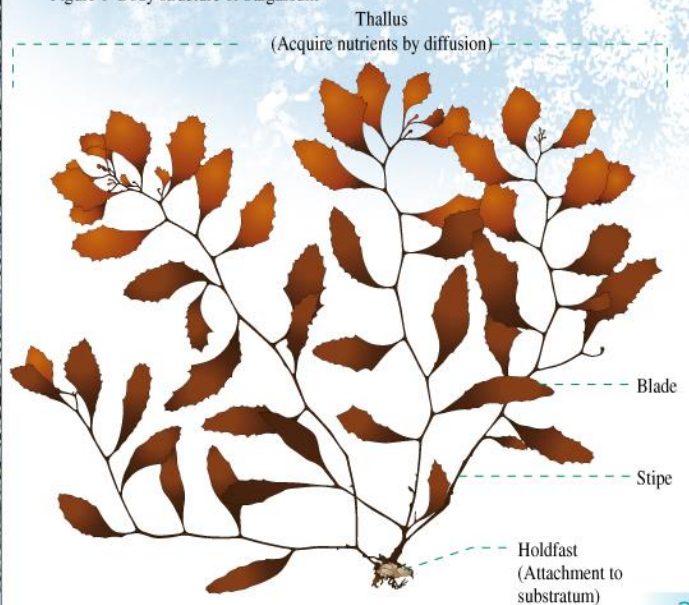


What is Seaweed?

Seaweed is a group of macroscopic marine plants living in coastal marine or brackish water. More technically, they belong to a group of organisms called algae. They are found globally dominating rocky intertidal shores and shallow subtidal. They are primitive plants that possess chlorophyll. Unlike higher plants, however, the body of seaweeds is not differentiated into true root, stem and leave. Instead, seaweed body, called thallus (plural = Thalli), is made up of blades, stipe (sometimes absent) and holdfast that acts like an anchor to fix the plant firmly onto the substratum (Figure 1).

Traditionally, seaweeds are classified into either one of the three major groups: red algae (Rhodophyceae), brown algae (Phaeophyceae) and green algae (Chlorophyceae), depending on the type of photosynthetic pigments that they have, other than the green chlorophylls.

Figure 1 Body structure of Sargassum



Functions of seaweed

A. Ecological Role

Seaweeds perform different roles in the coastal rocky intertidal and subtidal ecosystem. Their existence enhances the survival of other marine organisms living within the same habitat.

As a “supplier and transformer”

Seaweeds are primary producers in the intertidal and subtidal marine ecosystems. Just like tree and other plants on land, seaweeds play the roles of uptaking nutrients and dissolved CO₂ from the sea and through photosynthesis, transforming the energy from sunlight to other forms of energy that can then be utilized by other organisms in the ecosystem. In the process, they also supply and enrich the oxygen level in the seawater.



As a source of food

Seaweeds are important food sources for different marine lives such as the sea urchins (e.g. *Anthocidaris* spp.), grazing snails (e.g. *Chlorostoma rustica*) and herbivorous fishes such as the rabbitfishes (*Siganus* spp.). In fact, seaweeds like the plants on land that form the base of most inshore marine food chains as primary producers.



As shelter to other marine lives

Similar to the mangroves in the mudflat area, many larvae and juveniles of fishes and other invertebrates like mollusks, crustaceans and echinoderms use seaweed bed as their habitat. Seaweed bed thus serves as a nursery ground which provides shelters and food for many different marine lives. It is easy to find small animals such as hermit crabs, other crustaceans and snails under the thalli.



B. Utilization by human

Use of seaweeds as food has a very long history in China, Korea and Japan. *Porphyra* spp., *Laminaria* spp. and *Undaria* spp. are important components of oriental cuisine. *Porphyra* is the well known “Tsi Choi” in Chinese and “nori” in Japanese that is used extensively in sushi. *Laminaria* is commonly called “Hoitoi” in Chinese or “Kombu” in Japanese. These seaweeds are now cultivated extensively in these countries as the demand for them has increased tremendously. In addition, many seaweeds or extracts from seaweeds are also used extensively as fertilizers, animal feeds (for example in abalone culture) or in cosmetics, pharmaceutical, food and other industrial ingredients.

Seaweeds in Tung Ping Chau Marine Park

About 300 species of algae were recorded in Hong Kong while at least 65 species were recorded in Tung Ping Chau Marine Park. Among these seaweeds, about 13 species are green algae, 26 species are brown algae and 26 species are red algae. They are distributed from the intertidal to the shallow subtidal areas along the coast at A Ma Wan, A Ye Wan and Chau Mei Kok during the period from fall to spring. The strong wave action at Lan Kwo Shui and Lung Lok Shui brings adequate nutrients to nourish a higher diversity of algae which may extend to the depth of 10m.



Seasonal Appearance

The growing pattern of seaweeds in Tung Ping Chau Marine Park changes seasonally. The coverage and diversity of algae are usually high during the period from winter to spring. The large brown alga *Sargassum* spp., for example, has a fast growth phase in late fall and early winter, and reproduces during winter. Some of which can grow to the height of 3 m in length and form extensive *Sargassum* "forest" in Lung Lok Shui. However, during the summer time, most of the seaweeds will die back and the intertidal rock surfaces become barren. This pattern is part of the reproductive cycle of different seaweed species. Low tide occurring during daytime in summer also exposes most intertidal seaweeds to strong sunlight and high temperature, hence making the intertidal environment not too favourable for the seaweeds to grow and survive.



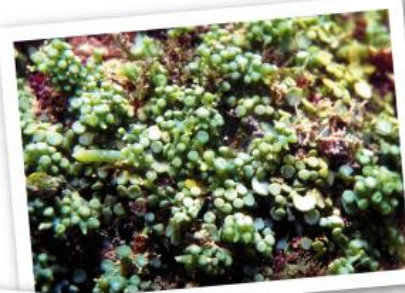
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Common Seaweeds in Tung Ping Chau Marine Park

Among 65 species of seaweeds recorded in Tung Ping Chau Marine Park, some of them are relatively more abundant or more commonly found. Some of these common species are described below for your better understanding.

Green Algae

Chlorophyceae
Caulerpa racemosa



Brown Algae

Phaeophyceae
Padina australis



Red Algae

Rhodophyceae
Galaxaura oblongata



Diverse
seaweeds in
Lung Lok Shui

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Chlorophyceae (GREEN ALGAE)

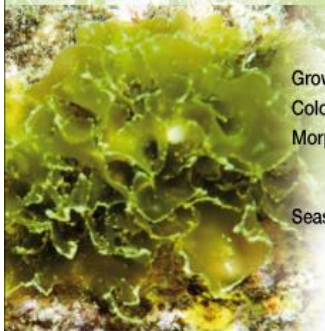
Caulerpa racemosa, Fern algae 蕨藻

- Distribution** : Usually found in Lung Lok Shui
- Growth form** : Coarsely branched
- Colour** : Thallus bright green
- Morphology** : Very beautiful! Wide spread thallus with long stolons. Grape-like terminal branches. Entangle firmly by rhizoids
- Seasonality** : Appear during winter and spring



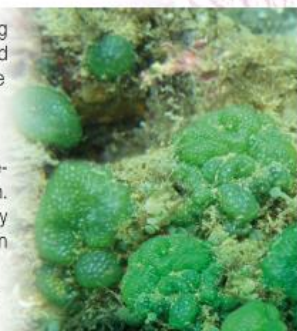
Ulva lactuca, Lettuce algae 石莼

- Distribution** : Found in shallow water region of A Ma Wan and A Ye Wan. Being exposed during low tide, especially in late summer and early autumn
- Growth form** : Sheet-like
- Colour** : Bright to deep green
- Morphology** : Thin sheet, external shapes are highly variable, from long, flat blade to broad and wide
- Seasonality** : Appear all year round, most abundant during winter and spring



Dictyosphaeria cavernosa, Green bubble algae 網球藻

- Distribution** : Could be found in Tung Ping Chau, but not easy observed because of its relatively small size
- Growth form** : Single layer forming balls
- Colour** : Bright green
- Morphology** : Spherical-shaped, large bubble-shaped cells that are easily seen. Attached on the substratum by rhizoids, occur individually or in clumps
- Seasonality** : Appear during winter and spring



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Rhodophyceae (RED ALGAE)

Corallina sessilis, Coralline algae 無柄珊瑚藻

- Distribution** : Very common in Tung Ping Chau
- Growth form** : Branching
- Colour** : Pink
- Morphology** : Branching with jointed calcareous branches, about 4 cm tall. Branches hexagonal and flattened. Body is calcified.
- Seasonality** : All year round but most abundant in colder months. May appear only as chalk-like thin layer in summer



Galaxaura oblongata, Coralline algae 乳節藻

- Distribution** : Abundant in Lung Lok Shui
- Growth form** : Branching and bushy
- Colour** : Pale pinkish color
- Morphology** : Jointed, calcareous branches that terminate in twos at the tip. Thallus calcified with of 5 – 10 cm tall
- Seasonality** : Mainly in colder months



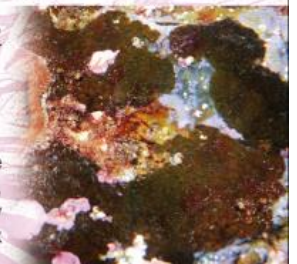
Hypnea charoides, Hooked weed 長枝沙菜

- Distribution** : Widely distributed in Tung Ping Chau
- Growth form** : Filamentous, thin and highly branched
- Colour** : Color variable from greenish to pale red
- Morphology** : Thin branches with many short spine-like lateral growths. May appear very bushy
- Seasonality** : Most abundant during late autumn, winter and spring



Hildenbrandia sp. 胭脂藻

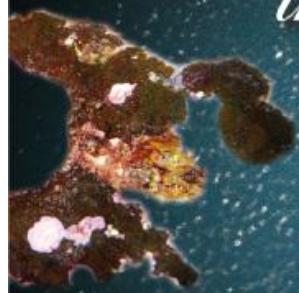
- Distribution** : Commonly found on rock surface, but often covered by sediments or other algae
- Growth form** : Sheet form, encrusting
- Colour** : Dark red patches
- Morphology** : Grow as crust or film on the surface (encrusting seaweed), irregular shape. Looks like rusty red paint being spilled on rock surface
- Seasonality** : Found throughout the whole year



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Seaweeds

in Tung Ping Chau Marine Park



胭脂藻
Hildenbrandia sp.



石莖
Ulva lactuca

石莖屬
Ulva sp.



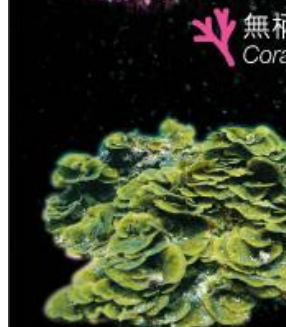
乳節藻
Galaxaura oblongata



網球藻
Dictyosphaeria cavernosa



蕨藻
Caulerpa racemosa



無柄珊瑚藻
Corallina sessilis



長枝沙菜
Hypnea charoides



匍扇藻
Lobophora variegata



樹狀團扇藻
Padina arborescens



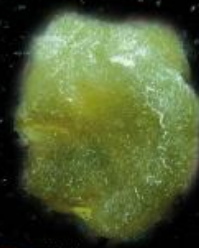
網地藻
Dictyota dichotoma



南方團扇藻
Padina australis



馬尾藻
Sargassum patens



囊藻
Colpomenia sinuosa