



Identification of precious corals



UNEP

GreenCustoms

Developed by the CITES Secretariat





Questions to answer

- What corals are included in the CITES Appendices?
- Which of these are the precious corals?
- How to identify the different kinds of precious corals?
- How to identify imitation precious corals?





Introduction

- Corals are marine organisms from the class Anthozoa and exist as small sea anemone–like polyps, typically in colonies of many identical individuals
- The group includes the important reef builders that are found in tropical oceans, which secrete calcium carbonate to form a hard skeleton





Introduction

- These coral groups are included in the CITES Appendices
 - Black coral *Antipatharia* spp., [Appendix II](#)
 - Red and pink coral (*Corallium elatius*, *C. japonicum*, *C. konjoi*, *C. secundum* - [Appendix III](#), China)
 - Blue coral *Heliopora coerulea*, [Appendix II](#)
 - Stony corals SCLERACTINIA spp., [Appendix II](#)
 - Organ-pipe corals Tubiporidae spp., [Appendix II](#)
 - Fire corals Milleporidae spp., [Appendix II](#)
 - Lace corals Stylasteridae spp., [Appendix II](#)





Introduction

- The **black, red/pink and blue corals** comprise the precious corals used in jewelry and decoration
 - Black coral *Antipatharia* spp., [Appendix II](#)
 - Red and pink coral (*Corallium elatius*, *C. japonicum*, *C. konjoi*, *C. secundum* - [Appendix III](#), China)
 - Blue coral *Heliopora coerulea*, [Appendix II](#)





Precious corals

- **Red and pink coral** *Corallium* spp. is distinguished by their durable and intensely colored **red or pink skeleton**, which is used for making jewelry
- **Black coral** is a term given to a group of deep water, tree-like coral which normally occurs in the tropics
 - Though its living tissue is brilliantly colored, black coral takes its name from the distinctive **black or dark brown color of its skeleton**
- **Blue coral** *Heliopora coerulea* is a **naturally blue** calcitic coral occasionally used in jewelry



Red and Pink Coral

- Red and pink coral (*Corallium*), the most valuable of the precious corals, has been fished for over 5,000 years
- Millions of items and thousands of kilograms per year are traded internationally as jewelry and in other forms
- Commercial yields of precious coral (all species) peaked in 1984 at 450 metric tons, declining to 40 mt by 1990, and fluctuating between 28 and 54 mt over the last 15 years







Red and Pink Coral

- Uses of red and pink coral
 - Jewelry
 - Art objects
 - Herbal or homeopathic medicine





Red and Pink Coral

- The trade in *Corallium*, primarily in the form of beads, dates to at least the Classical period and continued through the Middle Ages, with major exports of Mediterranean corals from Rome to India
- By the 17th century the major centers of the coral trade were in Naples, Marseilles and Livorno-Leghorn, with exports to India and West Africa
- Exports continued into the late 1800s, when Italy began importing large quantities of western Pacific *Corallium* from Japan and re-exporting processed coral beads to Asia and Africa



Red and Pink Coral

- Features sufficient for reliable identification at the species level within the *Corallium* genus do not exist for skeletons or as manufactured jewelry and curios, which makes up the bulk of the trade
- Taxonomic identification of octocorals requires microscopic analysis of shape, size and color of sclerites (tiny calcified skeletal elements) embedded in the coenochyme and in the organic matrix of the axial skeleton; these are lost when processed for jewelry

CoP14 Prop. 21



Red and Pink Coral

- Is it *Corallium*?

- True *Corallium* will exhibit a solid, pit-free, longitudinally striated surface

- Imitation *Corallium* such as glass, porcelain or dyed chalcedony can feel cold; plastic can feel warm; striations will not be parallel



- Dyed or polymer-impregnated corals of other species can be identified by their porous surface which may or not be filled in with polymer



Red and Pink Coral

- Is it *Corallium*?
 - *Corallium* has a solid texture—with extremely few holes being visible in its polished external surface, other than a clusters of pin point holes that are the remnants of the coral's central canal
 - True *Corallium* is **expensive**





Red and Pink Coral

- Is it *Corallium*?
 - *Corallium* can range in color from deep red to pink to almost white





Red and Pink Coral

- *Corallium rubrum*





Red and Pink Coral

- *Corallium elatius* (App. III)





Red and Pink Coral

- *Corallium secundum*



(App. III)





Red and Pink Coral

- *Corallium konojoi* (App. III)



- *Corallium japonicum* (App. III)





Corallium look-alikes

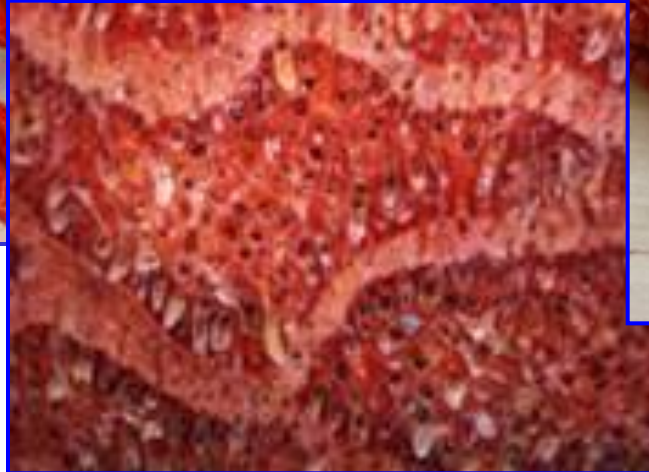
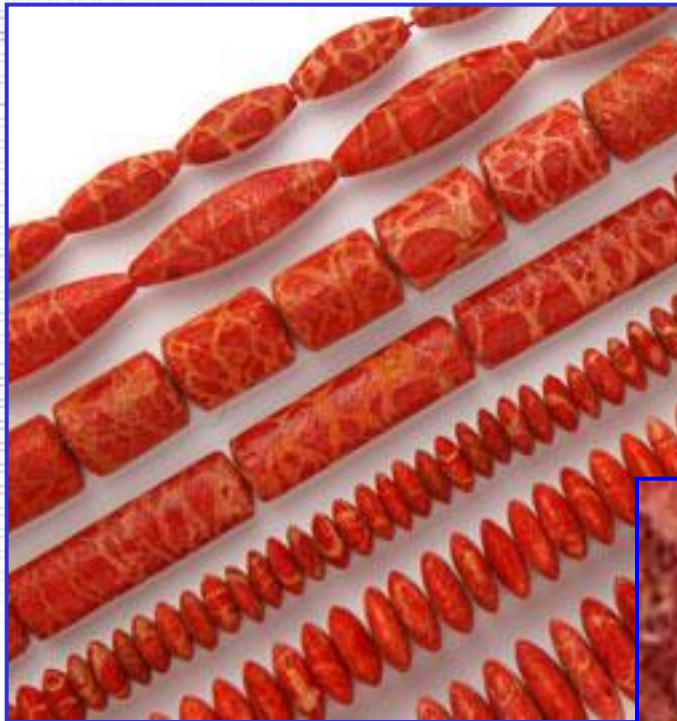
- **Sponge coral** (trade name) is made by dyeing red pieces of the gorgonian species *Melithaea ochracea* (non-CITES)
- It can be identified by its rough and porous surface; by lighter-hued reticulated pattern or brown patches or swirls that are still visible on polished surfaces; and by red pigment may be visible in defects, stringing holes and on the polished surface
- Sponge corals may also be resin impregnated to increase their durability





Corallium look-alikes

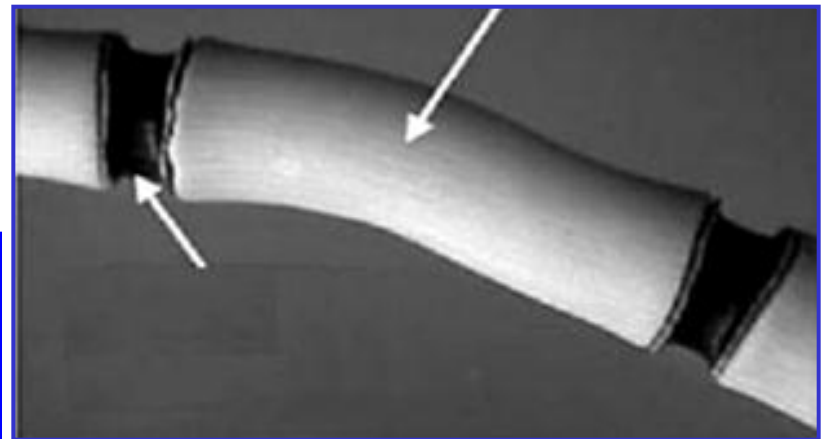
- Sponge coral





Corallium look-alikes

- **Bamboo coral** *Keratoisis profunda* (Family Isididae, non-CITES) is widely used as a *Corallium* substitute
- Bamboo corals possess a skeletal arrangement which resembles bamboo - the skeleton is composed of calcareous plates separated by joint-like gorgonin protein
- The natural color is creamy white with brown or black





Corallium look-alikes

- **Bamboo coral** skeletons have a smoother surface than sponge coral and can display longitudinal striations like *Corallium*
- Sometimes the harder calcitic sections are cut out and dyed to make small beads; larger pieces may retain the banded patterning





- Bamboo coral





Corallium look-alikes

- **Bamboo coral** using the calcitic sections only may be *impossible to differentiate* from *Corallium*, unless evidence of red dye can be seen under magnification



Bamboo coral

(dyed)





Bamboo coral
(natural)





Corallium look-alikes

- When the internodes of bamboo coral are dyed red or pink, this color enhanced coral can be difficult to discriminate from *Corallium* — unless evidence of residual dye or wax is observed





Black Coral

- **Black coral** is a term given to a group of deep water, tree-like coral which normally occurs in the tropics (*Antipatharia* spp. [Appendix II](#))
 - Though its living tissue is brilliantly colored, black coral takes its name from the distinctive black or dark brown color of its skeleton
 - The skeleton is made of a tough, keratin-like protein called conchiolin or gorgonin, which is not highly mineralized





Black Coral

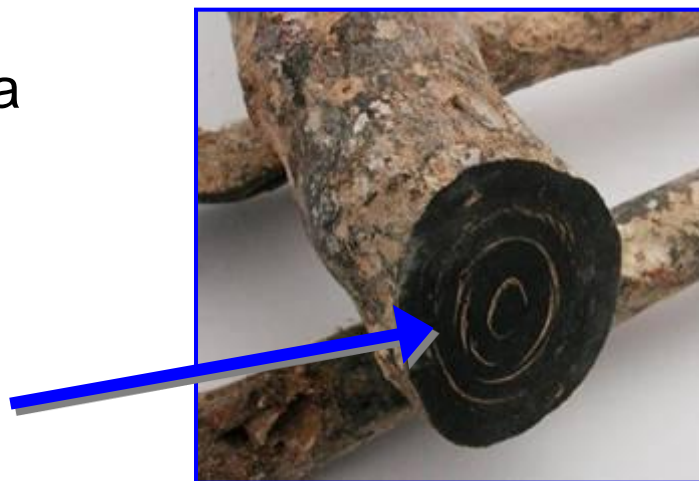
- Also unique to black coral are the **tiny spines** that cover the surface of the skeleton (black coral is also known as 'thorn coral')
 - Properly prepared and polished pieces are near the equal of the stony types in durability and beauty, and can exceed them in value
 - Black coral polishes very well, and colors range from black to dark brown to golden
 - Black coral is 'thermoplastic' (it can be reshaped with heat)





Black Coral

- Black coral can be identified by the presence of fine radially-arranged spines in unpolished sections, and remnants of the spines may be visible on polished surfaces under magnification
 - Though superficially black, strong light can shine through surface layers, giving them a waxy brownish-red color against which the spine structure is obvious
 - Applying a hot pin will release a 'salty burnt hair' odor
 - Cross-section cuts appears like a cross-section of a tree





Blue Coral

- Blue coral *Heliopora coerulea* (App. II) is a natural colored blue calcitic coral that has limited value in jewelry due to its porosity
 - The blue color is caused by the deposition of iron salts in the calcium carbonate skeleton
 - The blue skeleton is also popular in the marine curio trade and is made into jewelry and ornaments
 - The porous, relatively smooth surface has pores of two sizes - large pores of 0.7-1.0 mm diameter, and small pores of 0.1 mm diameter)





Blue Coral (imitation)

- Imitation blue coral





Summary

- The red/pink, black and blue corals are known as the precious corals
- These are widely used in jewelry and ornamentation
- Various non-CITES coral species may be dyed or otherwise processed to imitate precious corals
- Viewing under magnification (10x) may help identify precious corals



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