IDENTIFICATION GUIDE TO

TORTOISES AND FRESHWATER TURTLES:

Parts, Products, and Derivatives in Trade

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FUNDERS

This publication was made possible thanks to the financial support provided by the United Kingdom of Great Britain and Northern Ireland to the ICCWC Strategic Programme 2016-2020 for the implementation of CITES Decision 18.288 on *Tortoises and Freshwater Turtles* (Testudines spp.).

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ACKNOWLEDGEMENTS

Peter Paul van Dijk served as the Technical Advisor and Bruce Weissgold as the Reviewer of this Guide and provided valuable oversight and improvements to its content. We are grateful for the support and inputs of the CITES Secretariat staff, and especially Barend Janse Van Rensburg and Johannes Stahl. We also acknowledge the support of the USFWS Office of Law Enforcement (OLE). Barry W. Baker and Mary K. Curtis of the USFWS OLE National Fish and Wildlife Forensic Laboratory provided helpful information regarding identification and analyses, and both Rickey Tome and Raymond Hernandez of the USFWS OLE Wildlife Inspection Program provided additional input and images. Sneha Dharwadkar and Katie G. Garrett provided further helpful review and edits on portions of this guide. Support was also provided by Kadoorie Farm & Botanic Garden. We express deep gratitude towards everyone who contributed to the diversity of images that allowed for this Guide to be visually informative and engaging. We also give special thanks to the many users of iNaturalist who contributed images that were used in this guide.

Design and graphics by Katie G. Garrett.

SUGGESTED CITATION

Kolby, J. E. (2021). *Identification Guide to Tortoises and Freshwater Turtles: Parts, Products and Derivatives in Trade*. Commissioned by CITES Secretariat, Geneva, Switzerland.

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INTRODUCTION

The development of the present guide works to fulfill the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Decision 18.288 on Tortoises and Freshwater Turtles, which directs the CITES Secretariat to develop "a guide on categories of turtle parts and derivatives in trade, for national agencies responsible for wildlife law enforcement, to raise their awareness of the trade in these types of specimens, to enable initial recognition of such specimens, and to provide guidance on further identification resources and expertise that can be consulted."

The main purpose of this guide is to assist national agencies responsible for wildlife law enforcement in recognizing and identifying traded body parts, products, and derivatives of tortoises and freshwater turtles, particularly when the whole animal is not available for inspection. It also includes some information on sea turtles because they continue to be affected by illegal trade. This guide further illustrates the differences between certain groups of tortoises and turtles that may be encountered in trade.

Around the world, the trade in tortoises and turtles involves millions of animals each year and includes both legal and illegal trade activity. This high volume of trade poses a considerable conservation threat if not carefully monitored, regulated and enforced to ensure that trade is legal and sustainable. Most tortoise and turtle species are protected either nationally, internationally, or both. This guide is intended to help increase the likelihood that shipments of tortoise and turtle parts, products, and derivatives are identified and recorded, and that investigations will be pursued when laws or regulations may have been violated.

The trade in tortoise and turtle parts, products and derivatives occurs in many different forms, and due to the difficulty in recognizing these specimens, much of this trade appears to go undetected in the absence of knowledge and awareness thereof.

Following the introduction, the first chapter of this guide summarizes recent trade in these specimens and the second chapter describes each category of commonly traded tortoise and turtle parts, products and derivatives, including shells, bones, cartilage (also called calipee), meat, eggs, leather, medicine, and scientific and museum specimens. Some of these objects are not easily recognizable as originating from a tortoise or turtle, so an expert may need to be consulted for identification and confirmation, such as sending samples to a forensic laboratory for morphological or genetic analysis. The third chapter of this guide provides a directory of further identification resources, including laboratories for genetic and morphological analyses, specific experts who can be consulted, and a list of additional tortoise and turtle-related references.

Throughout this guide, we use the term "**tortoises and turtles**" to generally refer to all species in the order Testudines, including freshwater, terrestrial and marine species. For consistency with the language in CITES Decisions 18.286 - 18.291 on *Tortoises and freshwater turtles* (Testudines spp.) which is where the mandate for the present work originated, when the term "**tortoises and freshwater turtles**" is used throughout this guide, it refers to all species of Testudines, including both freshwater and terrestrial species, but specifically excluding all sea turtles (families *Cheloniidae* and *Dermochelidae*).

In the event that a live tortoise or turtle, or the majority of a complete specimen is available for inspection, it is recommended that the following detailed guide be utilized to identify the animal to genus and species whenever possible:

CITES Identification Guide – Turtles and Tortoises: *Guide to the Identification of Turtles and Tortoises Species Controlled under the Convention on International Trade in Endangered Species of Wild Fauna and Flora* / An initiative of Environment Canada and PROFEPA (SEMARNAP). Ottawa: Environment Canada, 1999.

This identification guide can be downloaded here.

Please note that the above guide describes only those species which were CITES-listed as of its publication in 1999, and many additional species have since been added to the CITES Appendices. All species presently listed in the CITES Appendices can be found at the updated Checklist of CITES Species and detailed information pertaining to each can be viewed at the Species+ website. For additional species identification resources, refer to Chapter 3 of this guide.

What are tortoises and turtles?

Tortoises and turtles are reptiles characterized by a bony shell, sometimes with extensive areas of flexible cartilage (e.g. softshell turtles), that encloses the body and sets these animals apart from all others. Tortoises and turtles are classified in the order **Testudines** within the class Reptilia.

Figure 1 Hermann's Tortoise *(Testudo hermanni).*

Tortoise and turtle diversity

The order Testudines presently contains 14 extant families of tortoises and turtles (TTWG 2017). Each has unique physical characteristics, with distinctive body morphology and differences in the shells that can sometimes help with recognition and identification efforts. Figure 2 is an evolutionary tree of the diversity of tortoise and turtle families, showing representative shell shapes and the current CITES status of its species.

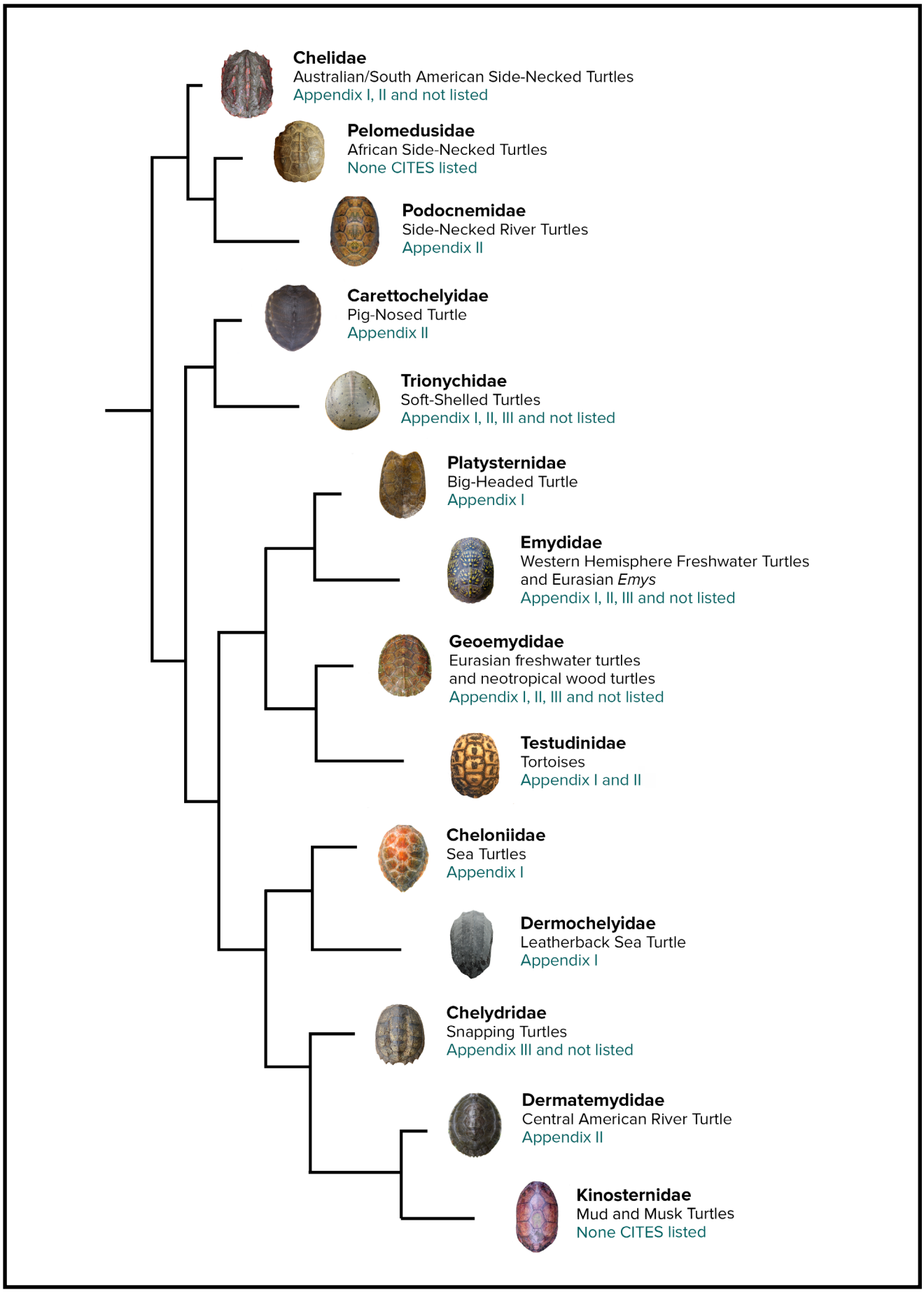
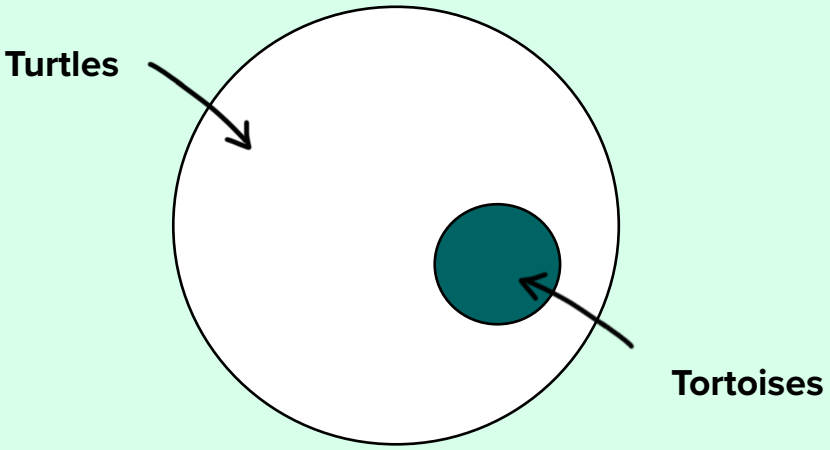


Figure 2 Evolutionary tree showing the 14 extant families of Testudines and presence of CITES-listed species.

Note on Terminology

In the English language, the words “tortoise” and “turtle” are both used in common language. Scientifically, tortoises are just one of 14 families of shelled reptiles which presently comprise the order Testudines.

Tortoises and Turtles - Order Testudines



Rather than referring to an animal as either a tortoise or turtle based on whether they are primarily terrestrial or aquatic, many languages instead make the fundamental division between species that are “soft-shelled” versus “hard-shelled.” Only English sets the tortoises apart from turtles in common language. Therefore, to avoid confusion in this guide, the phrase “**tortoises and turtles**” is used when referring to the order Testudines.

Dictionaries may translate a local word to “tortoise” as well as, or instead of “turtle”, even when the species is not technically in the tortoise family *Testudinidae*. Therefore, care must be taken in assigning the scientific name. Further confusion may arise because the Latin name for the order (Testudines) is similar to that for the family of tortoises (*Testudinidae*). This is further explained in Chapter 2.7.

It should also be noted that the word “terrapin” is widely used as a common name to describe many freshwater turtles in the English language, but this word does not denote a single taxonomic group. Many species referred to as terrapins belong either to the family *Geoemydidae* or *Emydidae*.

Glossary

Carapace: the top (dorsal) part of a tortoise or turtle shell

Plastron (plural: plastra): the bottom (ventral) part of a tortoise or turtle shell

Bridge: the bone and/or ligamentous tissue that connect the carapace to the plastron along the side of the body

Sutures: the lines where separate bony plates of a tortoise or turtle shell fuse together

Calipee: a term sometimes used to describe the cartilage found inside the plastron of sea turtles and softshell turtles, as well as the cartilage forming the posterior margin of the carapace of softshell turtles

Scutes: horny plates made of keratin that often cover the exterior surface of the shells of tortoises and turtles

Sulcus (plural: sulci): the outline of a scute that often remains visible on the bone's surface when removed from the shell

Keel: a bony ridge that runs down the back of some turtle shells, from neck to tail, along the length of the carapace, appearing as one, two, or three rows, depending on the species

CHAPTER 1:
THE TRADE IN TORTOISE AND TURTLE PARTS, PRODUCTS AND DERIVATIVES

There are presently 341 known species of tortoises and freshwater turtles and seven sea turtles throughout the world today (Rhodin et al. 2017). New species continue to be described, and this recognized taxonomy may change. At the time of preparing the present guide (February 2021), 182 species of tortoises and turtles are listed in the Appendices to CITES and valid CITES permits or certificates are required for legal international trade to occur in these species (Figure 3).

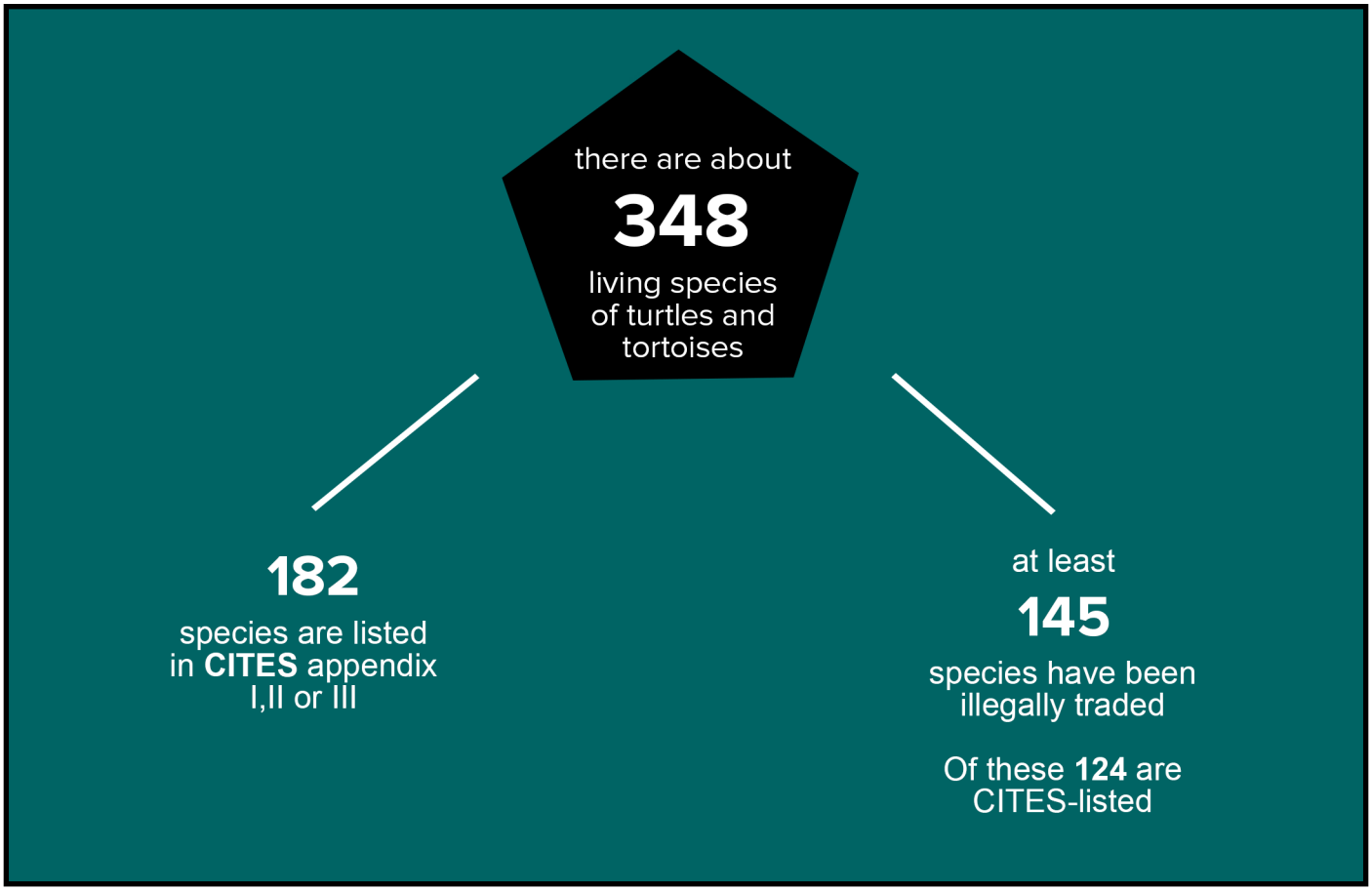


Figure 3

The trade in tortoise and turtle parts and derivatives is governed by a suite of regulations unique to each nation. CITES-listed species of tortoises and freshwater turtles can be found in at least 163 countries, most of which are Parties to CITES. Although nearly half of all 341 species of tortoises and freshwater turtles are not CITES-listed, this does not preclude Parties and non-Parties to CITES from also implementing

national regulations that govern their trade as well. Thus, for example, just as CITES Appendix-II listed species are traded illegally if all required provisions are not met, non-CITES listed species are likewise unlawfully traded if national laws are circumvented. Therefore, both CITES and non-CITES listed species appear prominently in legal and illegal records of this reptile trade.

At least 145 species of live tortoises and freshwater turtles have been traded illegally, including 124 CITES-listed species. Species from at least 10 of the 14 families of the order Testudines have been unlawfully traded as parts, products, or derivatives (CITES document CoP17 Doc.73). Species specific data on the trade in tortoise and freshwater turtle parts and products is much less commonly documented than it is for live animals because these specimens often lack key diagnostic features necessary for more precise identification. Therefore, records of illegal trade are often made only to the level of order or family, noting the presence of turtle or tortoise material, but posing challenges to evaluate the conservation impact of this trade on every species affected.

Tortoises and turtles are one of the most threatened groups of animals in the world. Figure 4 shows a summary of the conservation status of 250 species of tortoises and turtles that have been assessed by the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species.

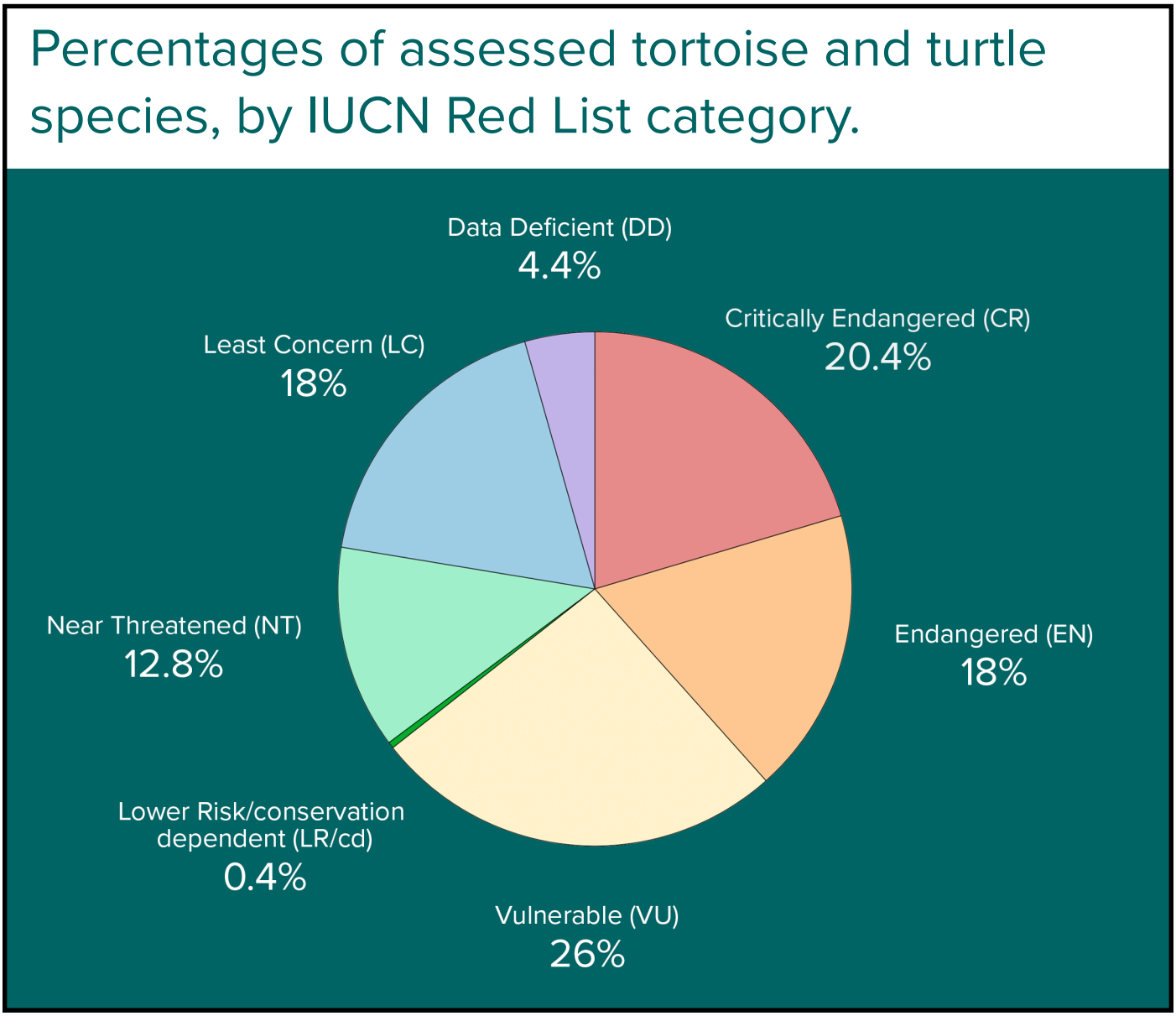


Figure 4

In 2016, the IUCN Species Survival Commission (SSC)'s Tortoise & Freshwater Turtle Specialist Group (TFTSG) produced a report included as Annex 2 to CITES document CoP17 Doc. 73, that summarized the illegal trade in tortoises and freshwater turtles based on seizure records from 2000 to 2015. This activity takes two main forms: live animals that are traded mostly as exotic pets or for food, and the trade in tortoise and freshwater turtle parts, products and derivatives for food, medicines, decorations and other uses. During this 15-year period, at least 3,562 seizures from illegal trade were recorded (Figure 5).

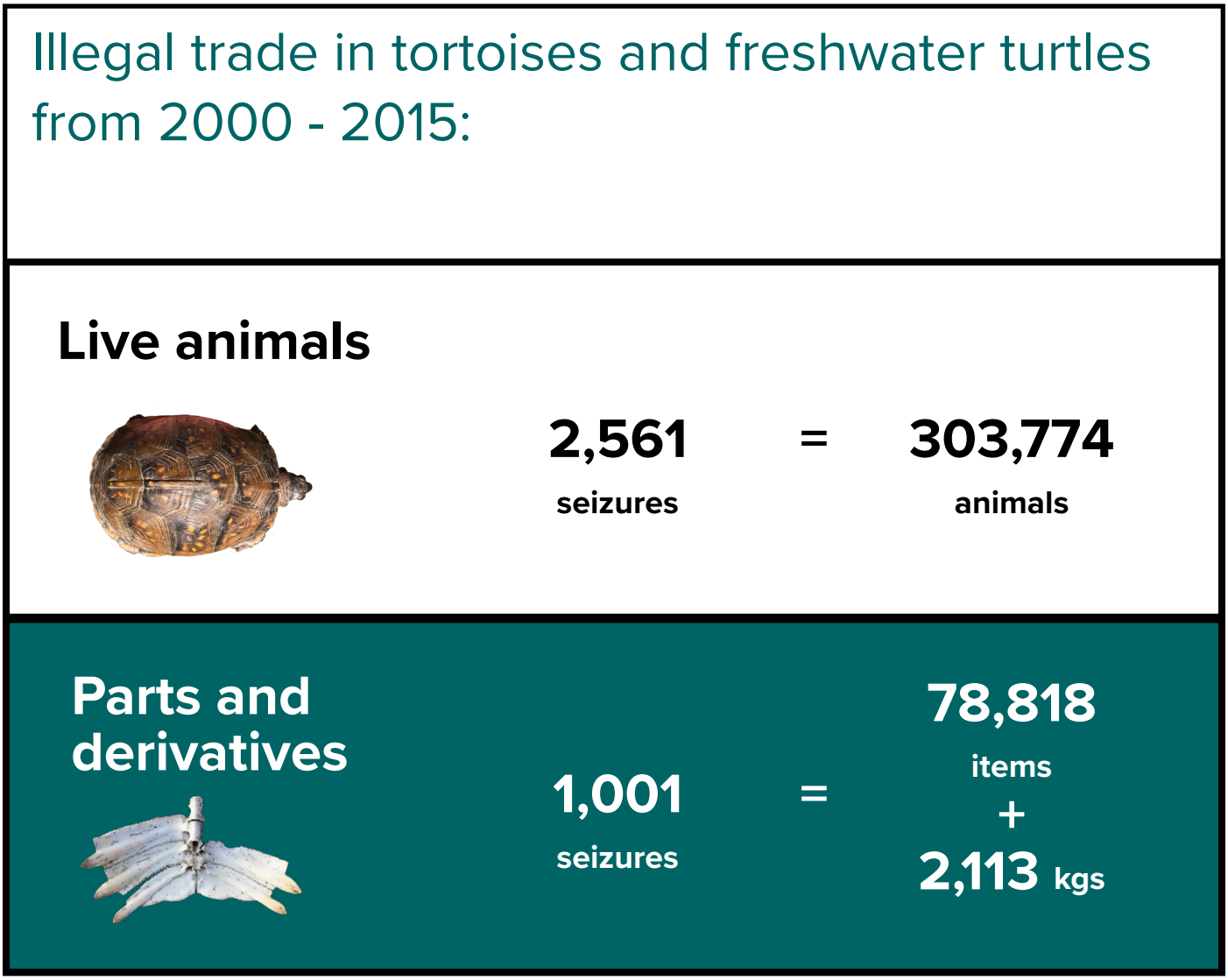


Figure 5 These seizure records involved at least 145 different species of tortoises and freshwater turtles, representing nearly 45% of all known species. Among them, 124 CITES-listed species were identified (CITES CoP17 Doc.73 Annex 2) at the time of seizure.

Regarding the illegal trade in tortoise and freshwater turtle parts, products and derivatives reported from 2000 to 2015, approximately 60% of seizure records were reported by New Zealand and the United States, each representing nearly 30% of reported incidents. The most prominent country of origin of this material was China. The prominence of New Zealand and the United States as major importing countries among the seizure records is a representation of intensive and consistent enforcement

and reporting efforts, rather than indicative of the absence of similar illegal trade in other destination countries. Collectively, these documented seizure events are believed to represent at least 10,000 illegally traded tortoises and freshwater turtles, although the actual number is likely to be much greater (CITES CoP17 Doc.73 Annex 2).

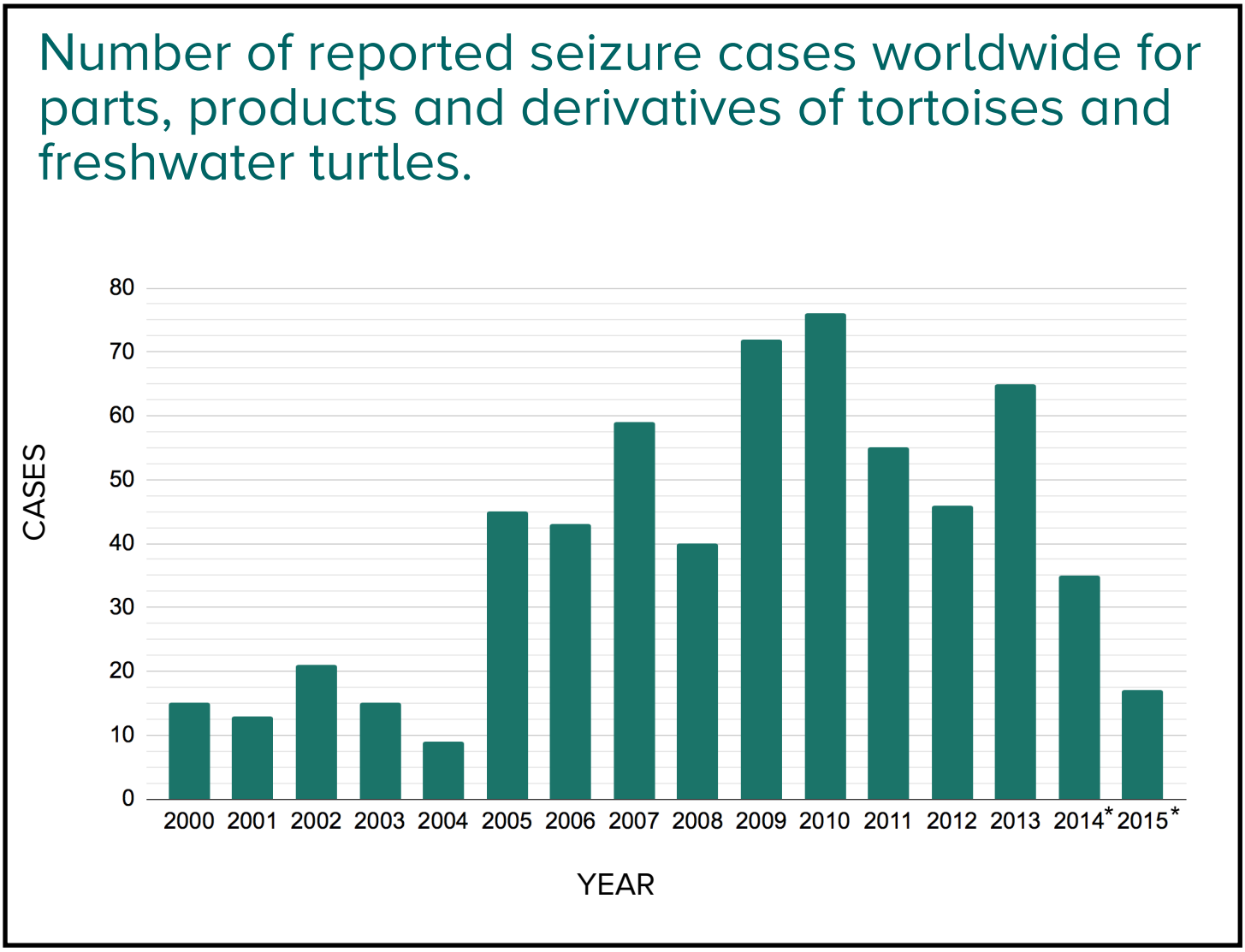
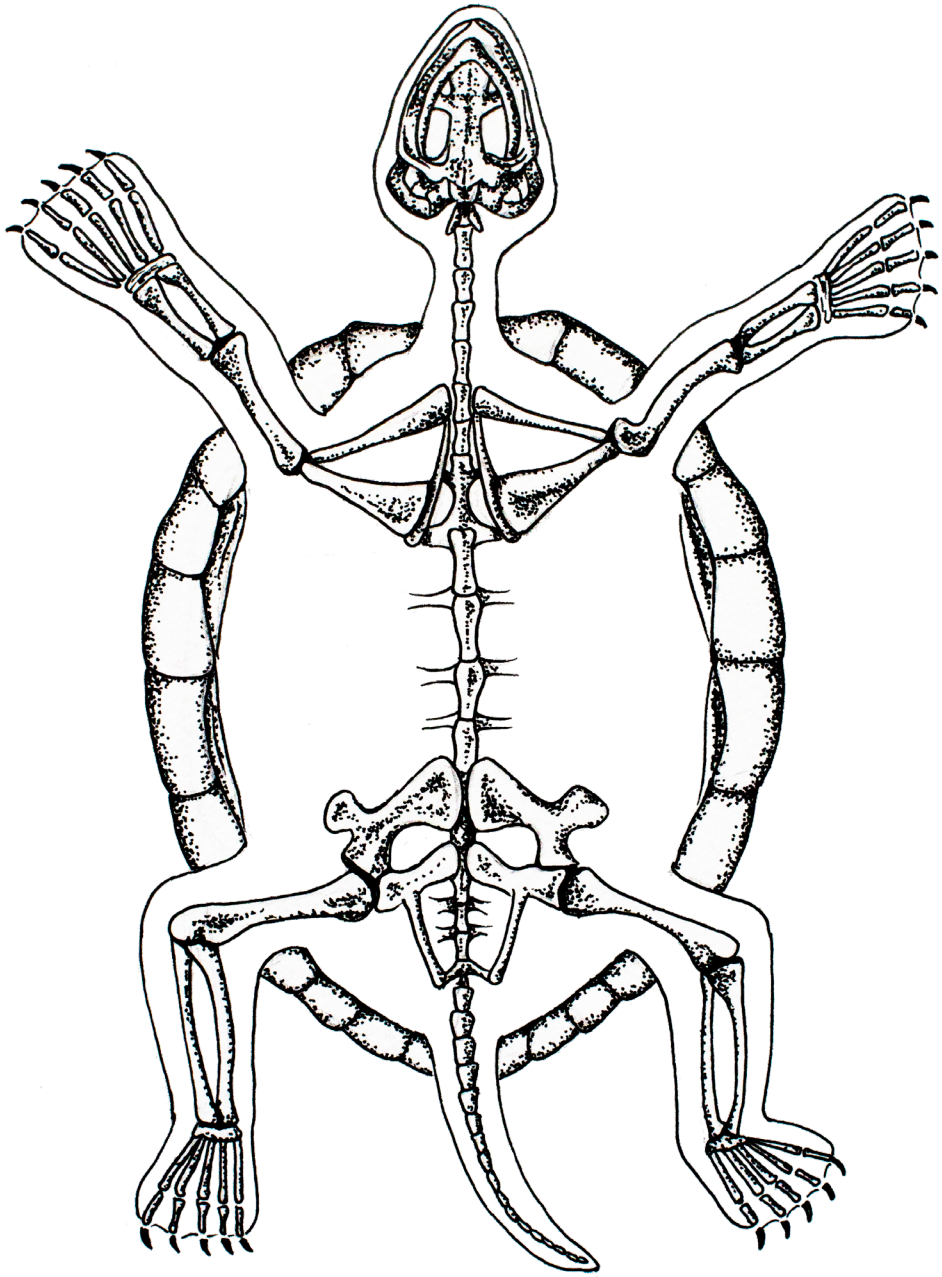
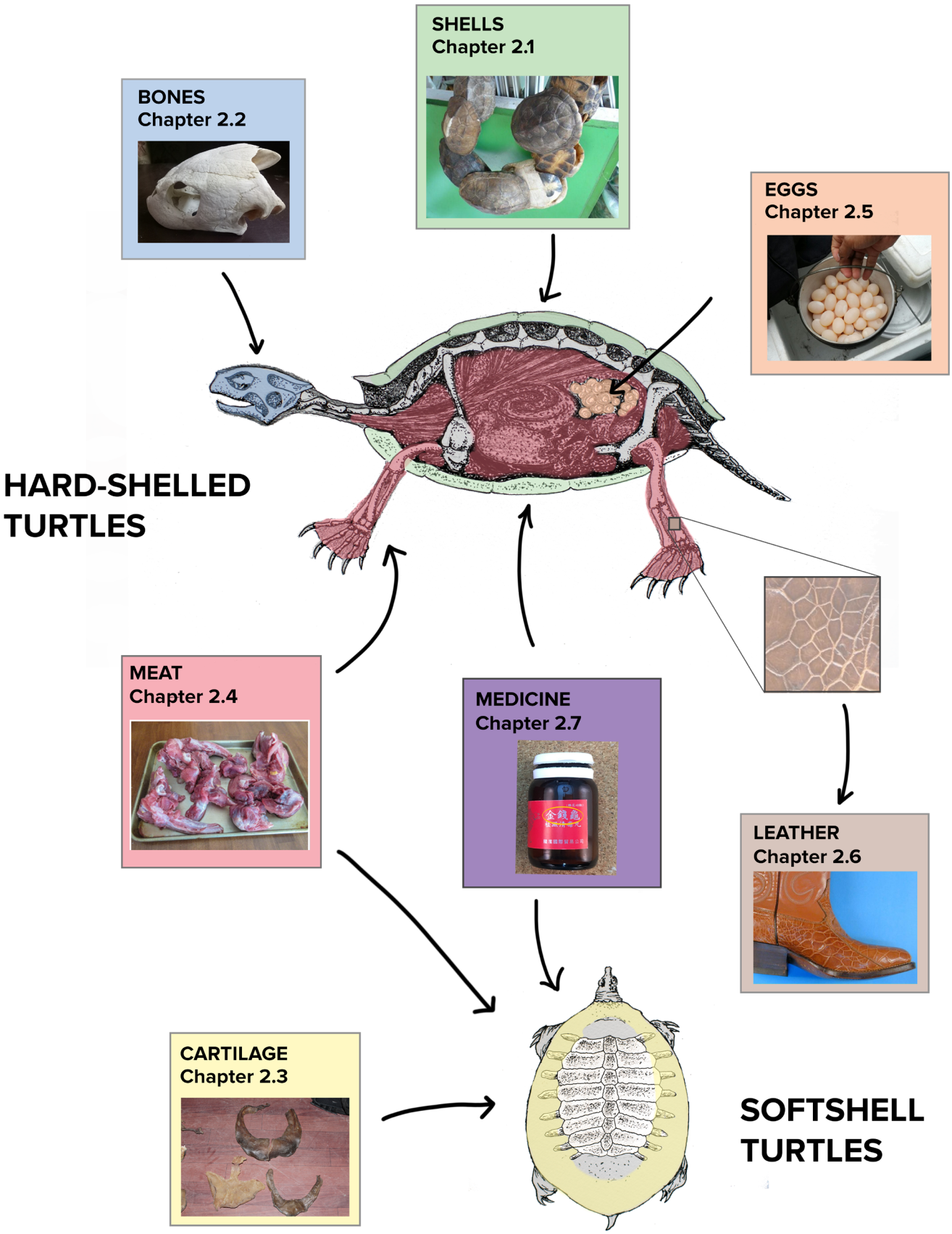


Figure 6 * Records of submission for 2014 and 2015 were incomplete at the time the dataset was made available for analysis. Therefore, figures for these years may be higher than shown in this graph. Source: CITES CoP17 Doc. 73 Annex 2, Figure 5.

CHAPTER 2:
CATEGORIES OF TORTOISE AND TURTLE PARTS, PRODUCTS AND DERIVATIVES



Guide to categories



CHAPTER 2.1: TORTOISE AND TURTLE SHELLS

The shell of a turtle or tortoise consists of the **carapace** which is the top (dorsal) part of the shell, and the **plastron** (plural: **plastra**) which is the bottom (ventral) part of the shell. These two pieces attach along the sides of the body with areas of bone or ligamentous tissue forming the bridge that connects them (Figure 7).

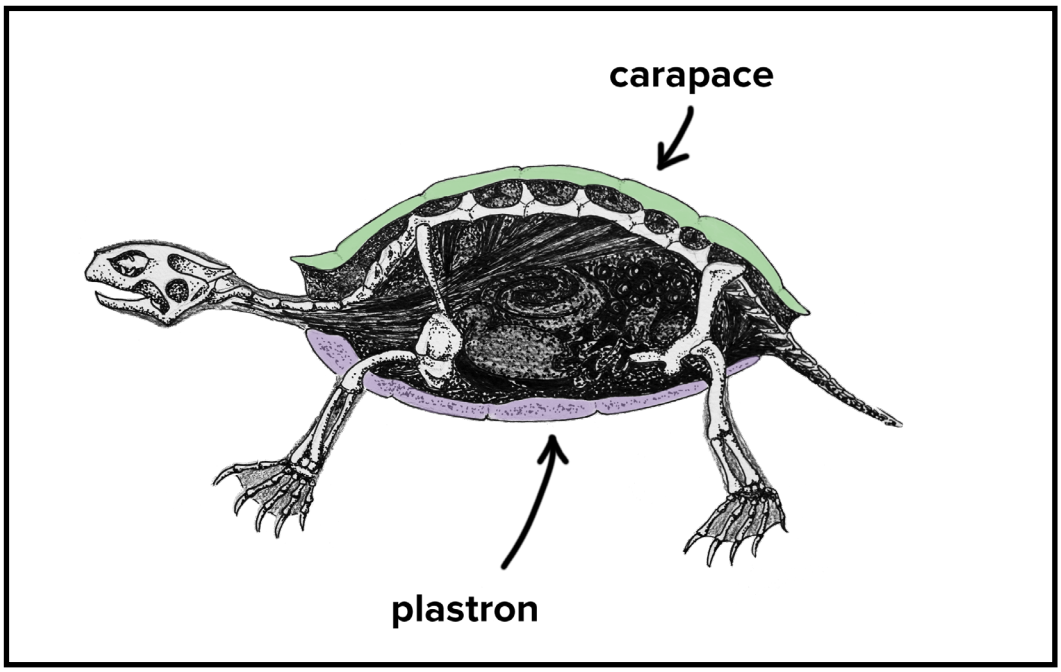


Figure 7 Cross section of a tortoise or turtle showing carapace (green) and plastron (purple).

Both the carapace and plastron of a tortoise or turtle are made of many bony plates which are sutured together (Figure 8). The lines where these bony plates meet are called the sutures and observing these features is useful in the identification of shell bones compared to bones of other animals. The interior body cavity of a turtle or tortoise is mostly free of bones because the spine and ribs are fused into the carapace. The hip and shoulder bones are either suspended inside the shell by ligaments or are sutured solidly to the inside of the shell.

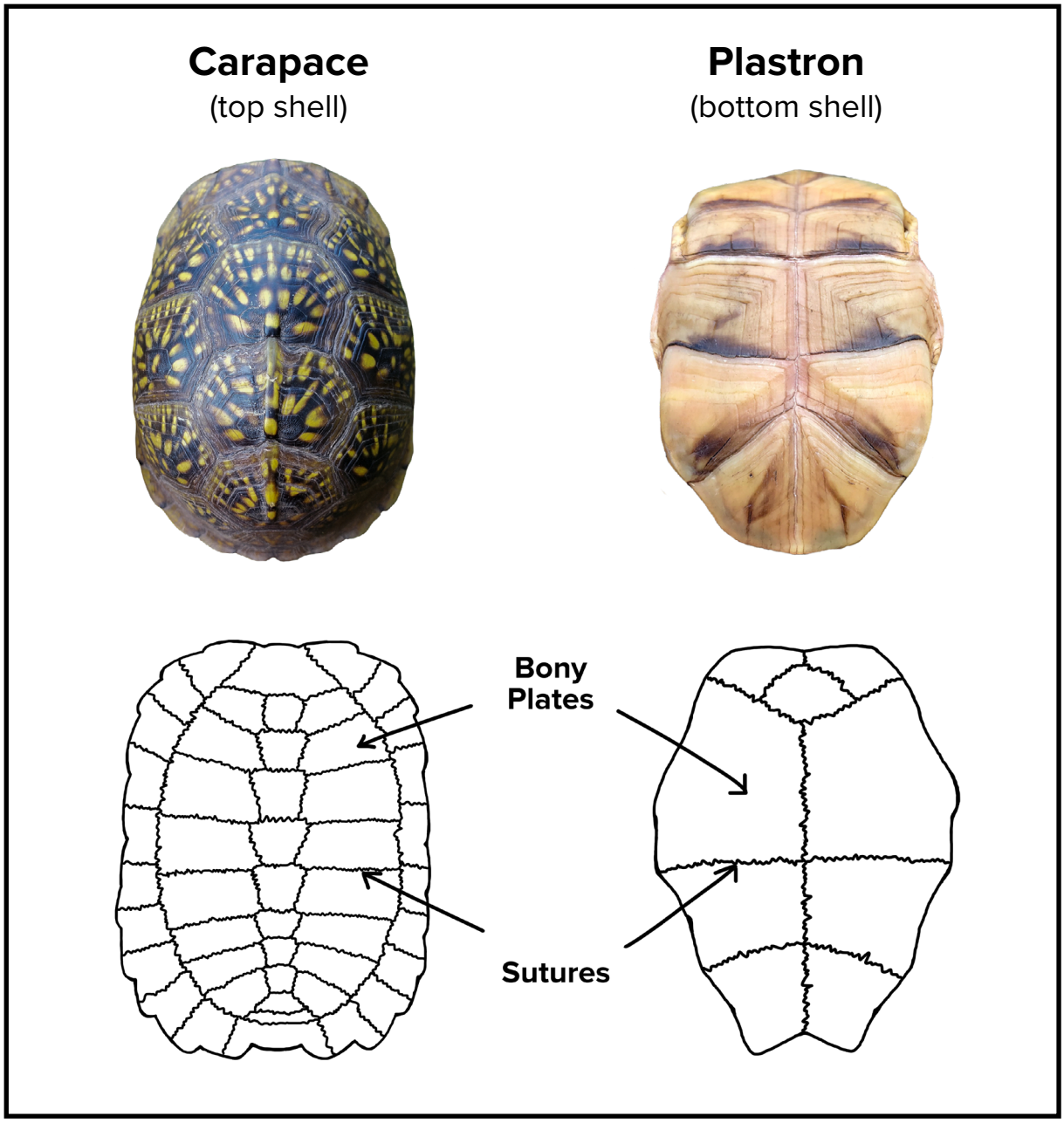


Figure 8 Generalized pattern of bones that make up the shell of a tortoise or turtle.

In most species of tortoises and turtles, the exterior surface of the shell is covered by horny plates called **scutes**. Scutes are made of keratin, which is the same material that makes up human hair and fingernails, and other traded wildlife body parts such as pangolin scales and rhinoceros' horn.

It is important to note that the pattern of scutes visible from the shells' surface on a live animal is not the same as the pattern of bony plates that lie underneath. Individual scutes are often much larger than the plates below and cover multiple bones (Figure 9). The outline of the scutes often remains visible on the bones' surface when removed and these indentations are called sulci (singular: **sulcus**). They appear as distinct impressions in the underlying bony plates, but they do not go all the way through the bone as sutures do.

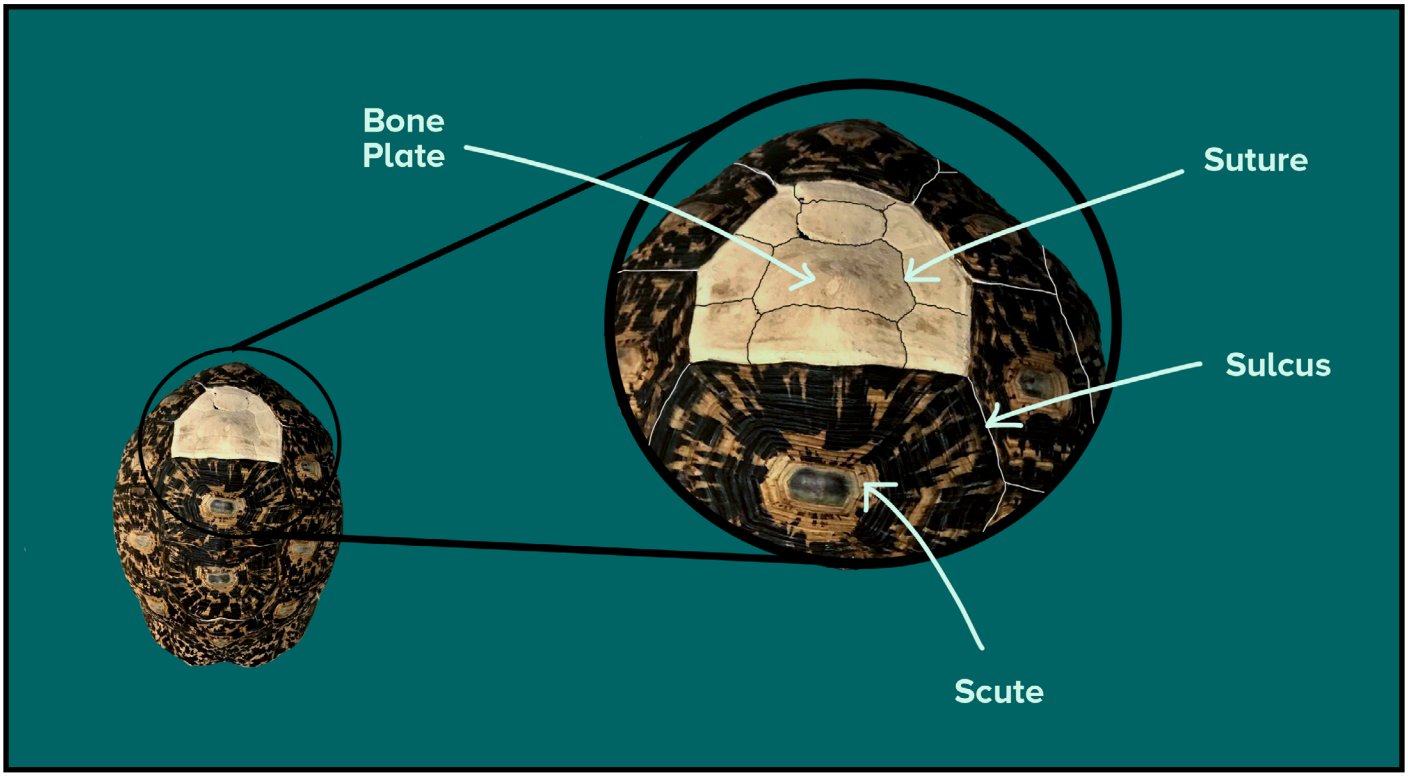


Figure 9 Shell of Leopard Tortoise *(Stigmochelys pardalis)* with one scute removed.

Scutes are firmly attached to the shell and in some species the outer layers may flake off or shed, but only intermittently. Commercially traded scutes are almost always taken from animals that have been killed, and primarily from sea turtles. These scutes are made into jewelry and other fashion accessories and are often referred to as "tortoiseshell" or "bekko" when traded. Bekko is a Japanese term used to describe either the raw material or finished items (van Dijk & Shepherd, 2004). These items

most often involve scutes from the Hawksbill Sea Turtle (*Eretmochelys imbricata*) and to a lesser extent, Green Sea Turtle (*Chelonia mydas*).

Some freshwater turtles do not have scutes and instead have leathery skin covering the bones of their shells. These are the softshell turtles and flapshell turtles of the family *Trionychidae* (Figures 10 and 11) and the Pig-nosed Turtle of the family *Carettochelyidae* (Figure 12). These are all highly aquatic turtles which are also less dome-shaped and are more streamlined, allowing them to swim easily through the water. The Leatherback Sea Turtle (*Dermochelys coriacea*) also has a tough leathery shell that is more barrel-shaped, and has distinct ridges running laterally down the carapace and plastron (Figure 13).

Figure 10 Chinese Softshell Turtle *(Pelodiscus sinensis).*

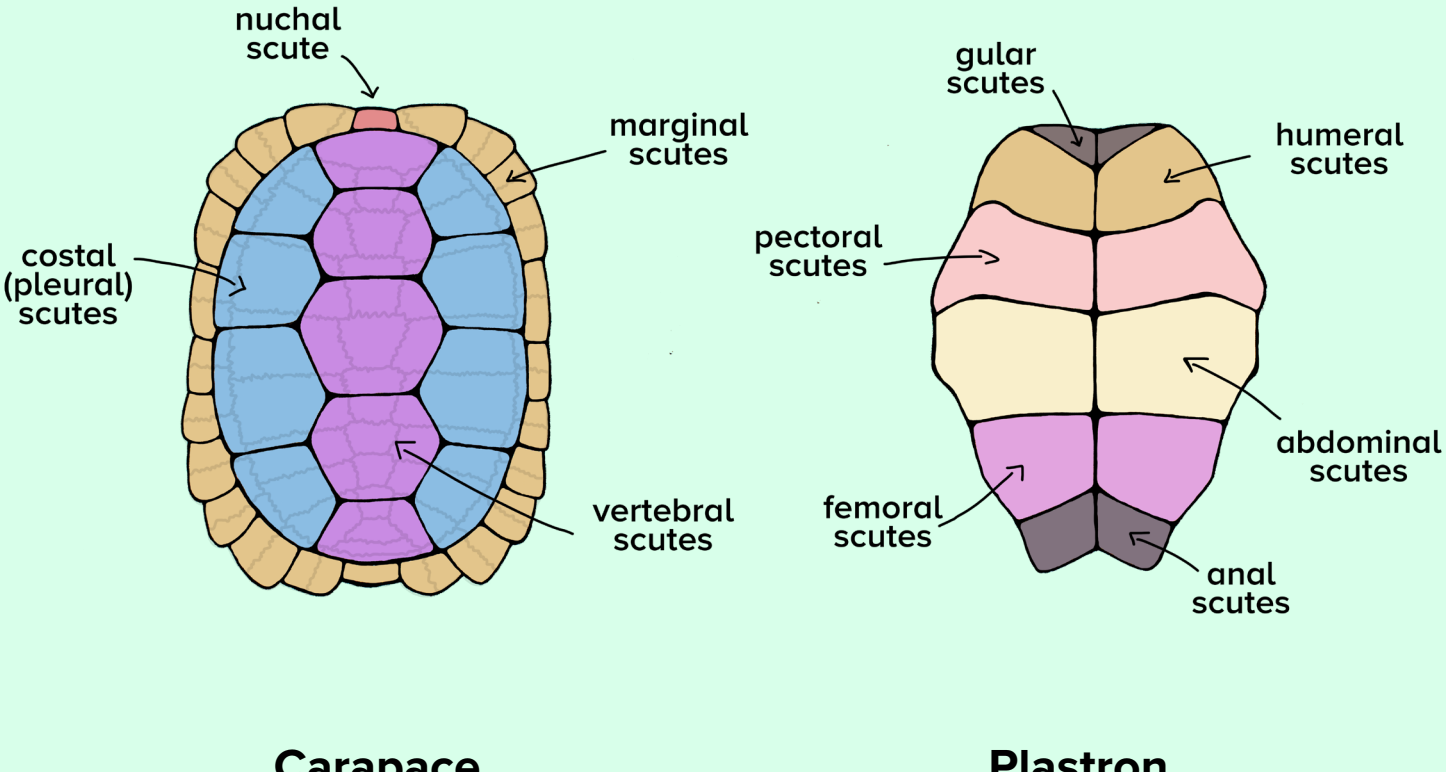
Figure 11 Indian Flapshell Turtle *(Lissemys punctata).*

Figure 12 Pig-Nosed Turtle *(Carettochelys insculpta).*

Figure 13 Leatherback Sea Turtle *(Dermochelys coriacea).*

Identification Tip

For tortoises or turtles with visible scutes, arrangement and colors of scutes can vary and provide clues for identifying different groups and species.



Some of the easily observed major differences among tortoise and turtle shells are described below (Figures 14 - 18) followed by representative species and the parts most commonly traded. If a whole carapace or plastron is available for inspection, it is recommended that the *CITES Identification Guide to Turtles and Tortoises* is used, or any of the other identification guides listed in CITES CoP17 Doc.73 Annex 4, to help identify the specimen as close as possible to species.

Variation in shell appearance

When viewed from above, the carapace of most tortoises and turtles is generally oval or round in shape. Some variations include those that are more teardrop-shaped (e.g. sea turtles) and others that are round but with serrations along the back edge (e.g. snapping turtles and map turtles).

Figure 14

The plastron of most tortoises and freshwater turtles is also rounded or oval in shape, and covers most of the underside of the animal, with some notable exceptions like those in the families *Chelydridae*, *Trionychidae*, and some members of *Kinosternidae*, where the plastron is greatly reduced in shape and size and forms little more than a cross (Figure 15).

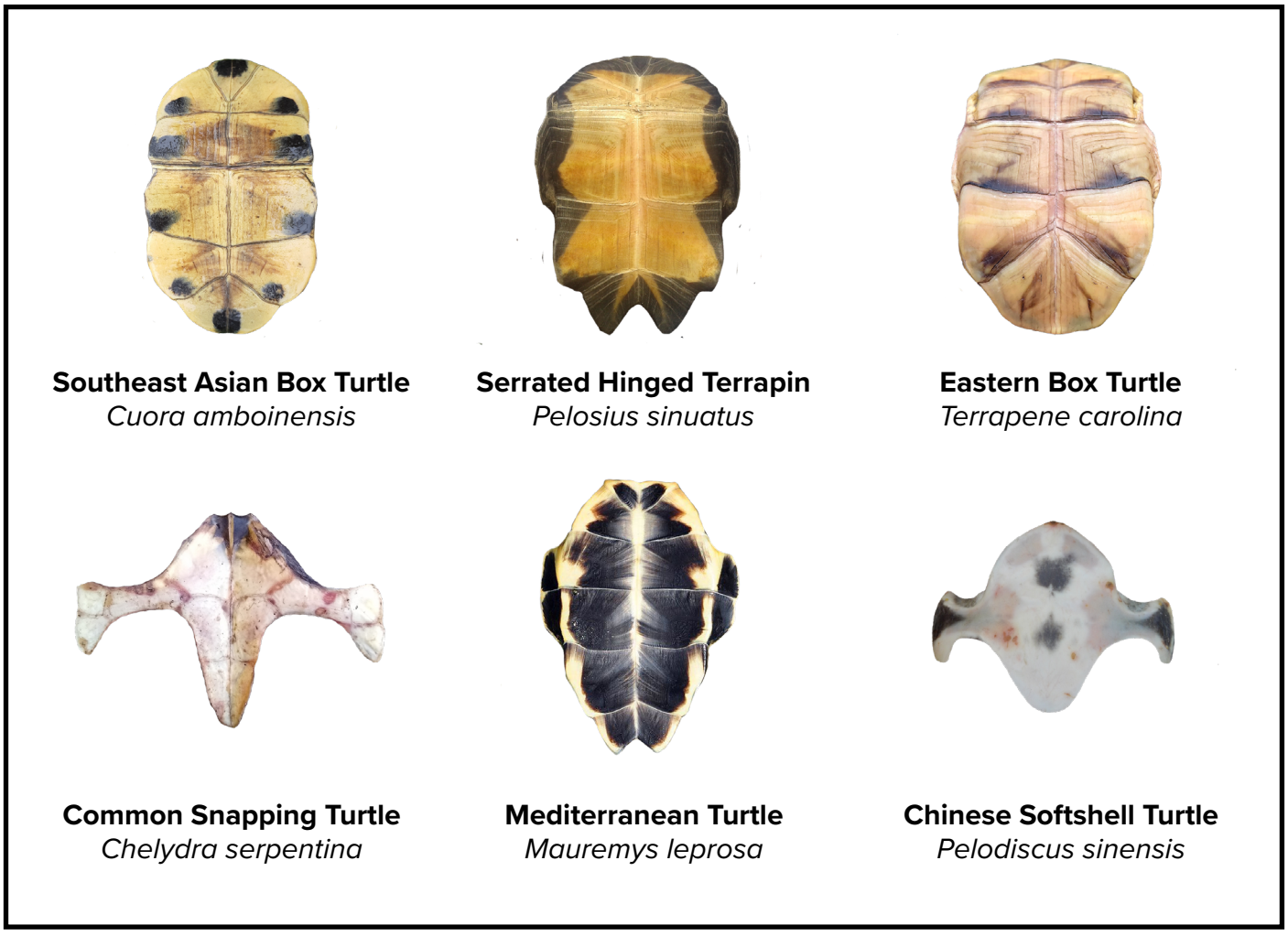


Figure 15

The carapace is often dome-shaped while the plastron is generally flat. The extent to which the carapace is domed can vary significantly between families, with tortoises and box turtles having shells with the highest domes, and others such as the softshell turtles (*Trionychidae*) have horizontally flattened bodies and only a very slightly convex carapace (Figure 16). With some exceptions (e.g. the Pancake Tortoise, *Malacochersus*

tornieri), turtles with flatter carapace shells are more often aquatic species than their terrestrial counterparts.

Eastern Box Turtle
Terrapene carolina

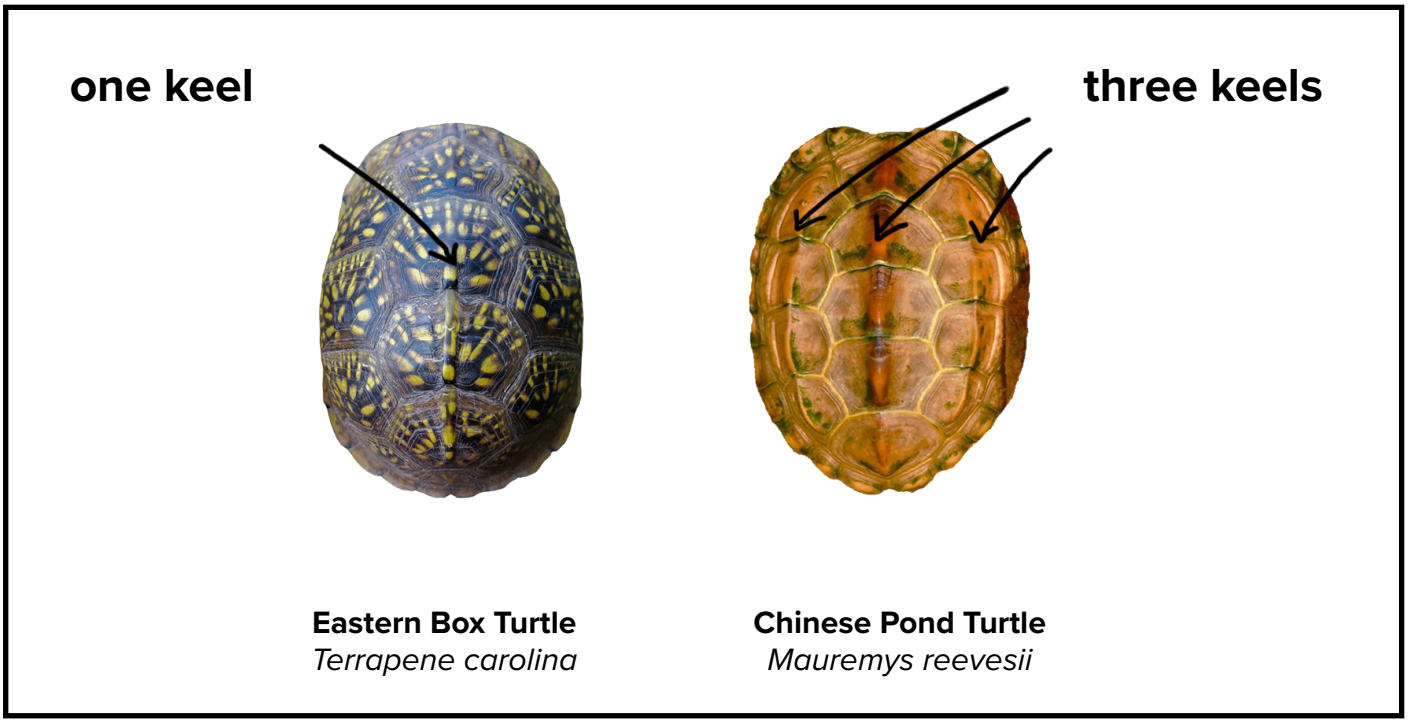
Greek Tortoise
Testudo graeca

Eastern Painted Turtle
Chrysemys picta

Spiny Softshell Turtle
Apalone spinifera

Figure 16

Some species have one or more bony ridges that run down the back of their shell, from neck to tail, along the length of the carapace. Such ridges, also called **keels**, appear as one, two, or three rows, depending on the species (Figure 17).



Eastern Box Turtle
Terrapene carolina

Chinese Pond Turtle
Mauremys reevesii

Figure 17

Some species have one or two horizontal joints in the plastron, which act as a **hinge** and allows the turtle to retract its body into the shell and then pull the carapace and plastron together tightly. These are often called box or hinged tortoises and turtles (Figure 18).

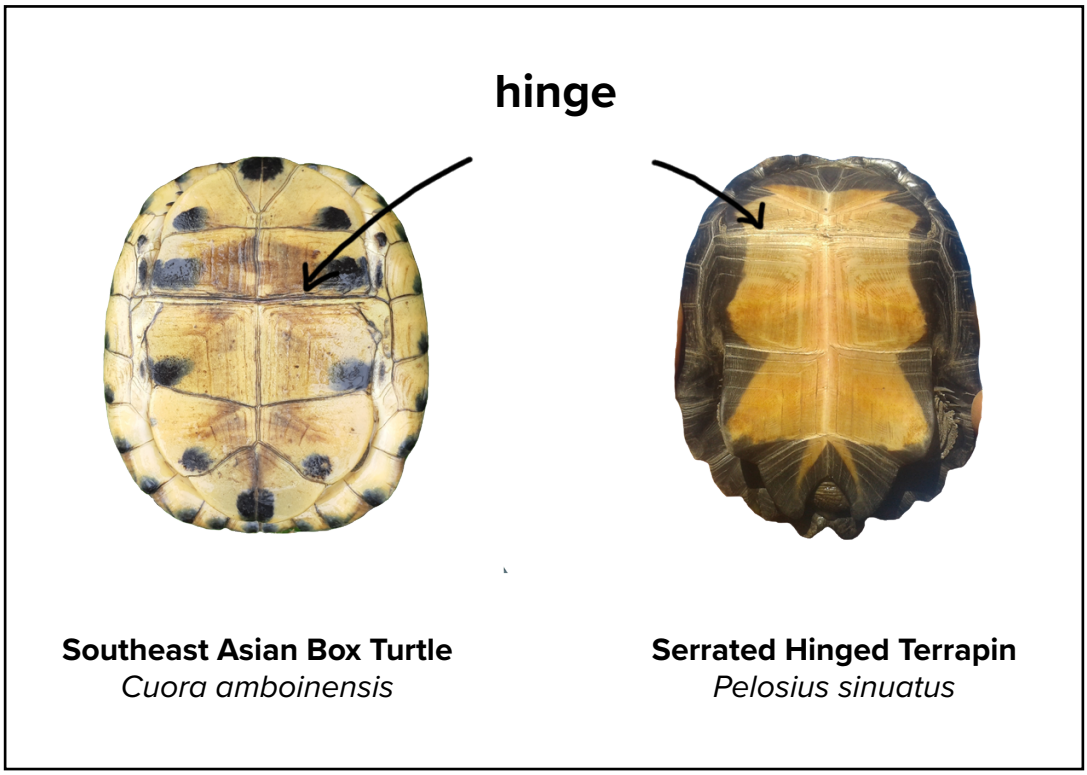


Figure 18

Shell bones

In this guide, the terms “shell” and “bone” are often used interchangeably because the shell of a tortoise or turtle is primarily made of bone, aside from the scutes which may or may not be present in a traded specimen. Most of the material traded as tortoise or turtle bone is generally derived either from the carapace or plastron of the shell.

Figure 19 Common Snapping Turtle *(Chelydra serpentina).*

Unlike species of tortoises and turtles with a hard dome-shaped bony carapace (Figure 20), softshell and flapshell turtles of the family *Trionychidae* have a flattened carapace that is leathery and pliable, especially around the cartilaginous edges. When this cartilaginous material is traded for human consumption, it is often referred to as calipee (see Chapter 2.3). The central part of the carapace still contains a bony disc including the rib bones, but the dermal plates usually stop before the outer edges and a narrow portion of rib extends outwards (Figure 21). The amount of rib bone that protrudes from the bony plates changes as the animal grows older, where rib tips extend greatly in juveniles, but in adults the dermal bones have expanded to include most of the rib. Most sea turtles have similar shaped carapace bones but with the addition of a series of small bones (termed the marginal bones) outlining the perimeter of the shell (Figure 22).

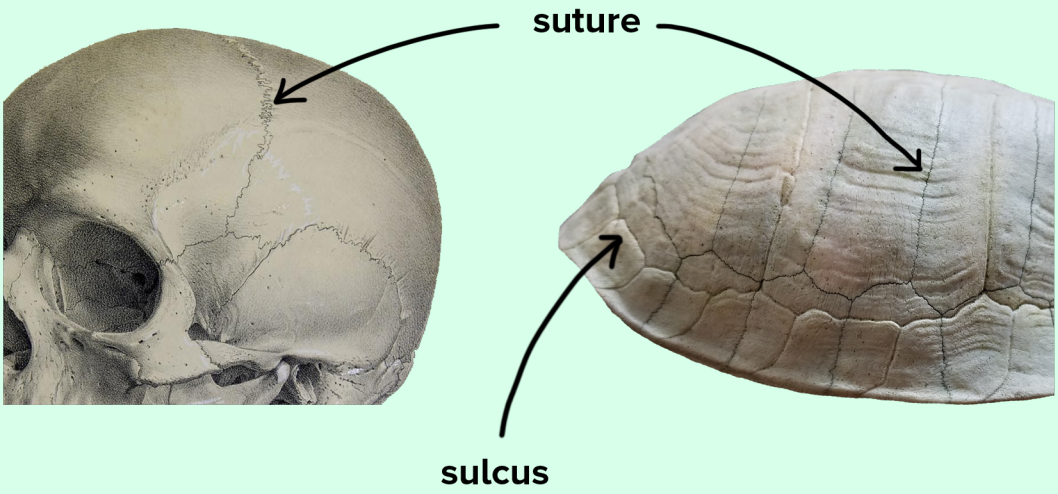
Figure 20 Eastern Box Turtle *(Terrapene carolina).*

Figure 21 Smooth Softshell Turtle *(Apalone mutica).*

Figure 22 Hawksbill Sea Turtle *(Eretmochelys imbricata).*

Identification Tip

The lines where two bone plates meet are called sutures. Tortoise and turtle shell bones can be most easily identified by looking for these fusion lines between smooth bones, particularly if the bones are crushed and the overall shape of the shell can not be distinguished. This applies generally to all tortoises and turtles. The only other commonly traded wildlife items that show similar sutures are animal skulls.



Human skull (left) and Box Turtle shell (right) showing bone sutures. Also note the visibility of the sulci in the Box Turtle shell, marking where the scutes were attached to the bone.

The plastron of softshell, flapshell, and sea turtles is characterized by dermal bones that are spiky and irregular, rather than square or rectangular. Instead of bone, the plastron is attached to the carapace by a bridge of ligamentous tissue.

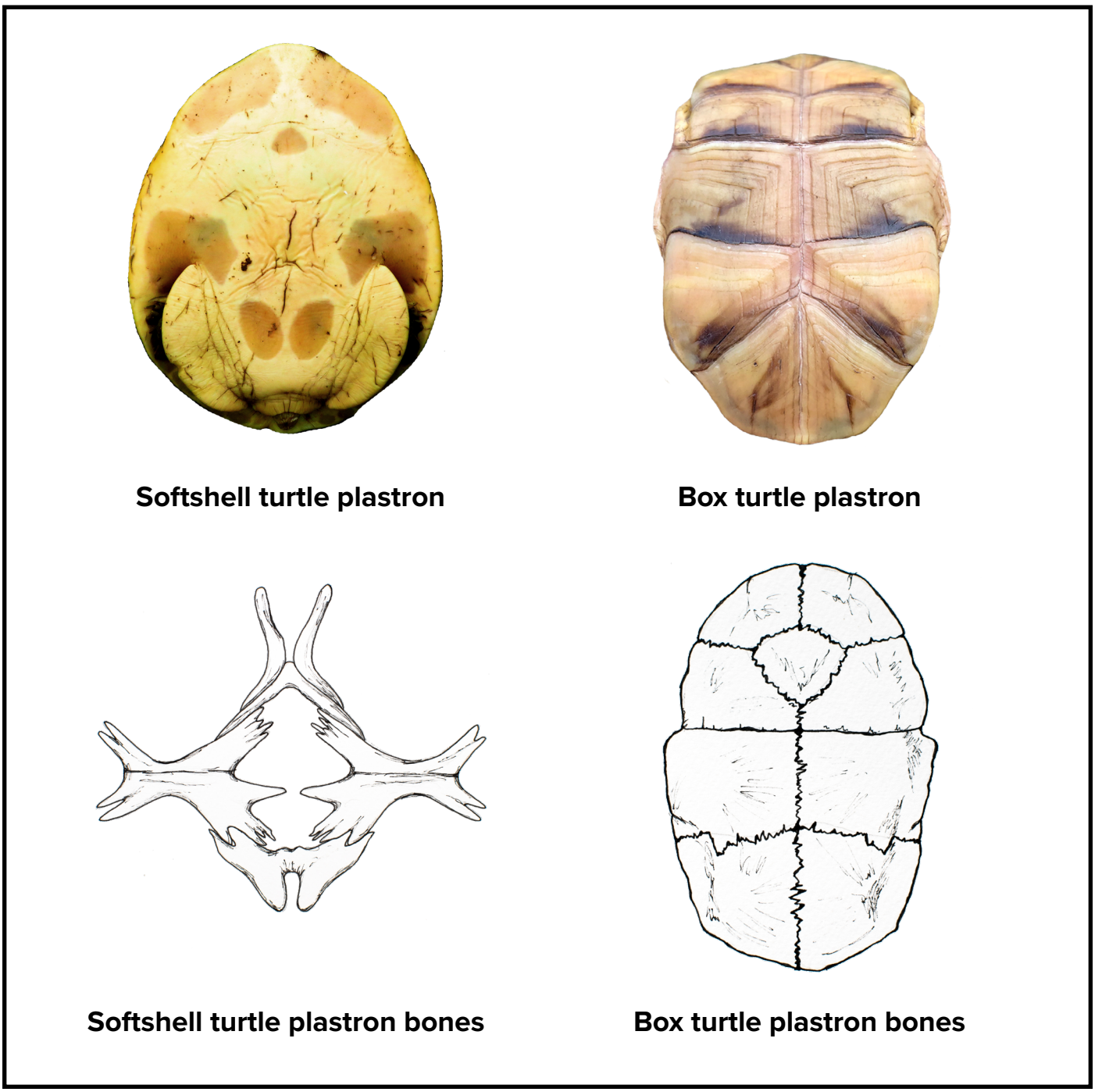


Figure 23 The bones that form the plastron of a softshell turtle differ subtantially from those of a hard-shelled turtle.

In Figure 23, note how the bones of softshell turtles (family *Trionychidae*) do not form a solid oval-shaped plastron as seen in most hard-shelled turtles. Despite the presence of a gap in the center of the turtle plastron bones, it is covered by cartilage and skin in a live animal and appears as a solid plate.

Another notable exception to the hard-shelled turtles is the Leatherback Sea Turtle (*Dermochelys coriacea*), which is the only species of sea turtle that does not have a bony carapace and is also lacking scutes. This turtle has thick rubbery skin covering its dorsal surface (Figure 24), strengthened by thousands of tiny bone plates embedded inside the skin which are more visible in the juveniles (Figure 25).

Figure 24 Adult Leatherback Sea Turtle *(Dermochelys coriacea).*

Figure 25 Juvenile Leatherback Sea Turtle *(Dermochelys coriacea).*

Shell specimens in trade

Tortoise and turtle shells are most often traded as ingredients in traditional medicines, and to a lesser extent as jewelry, musical instruments, souvenirs and other decorative objects and scientific specimens.

When traded, tortoise and turtle shells can take many different forms and appearances, generally varying by the intended end uses. Sometimes the shells are traded whole with the carapace and plastron intact, especially when traded as souvenirs, curios, or decorations, while shells for medicinal use are often traded in pieces as separated plastron and carapace, as loose whole bone plates or crushed bone fragments, or as powdered bone either raw or processed into pills and other medicinal products.

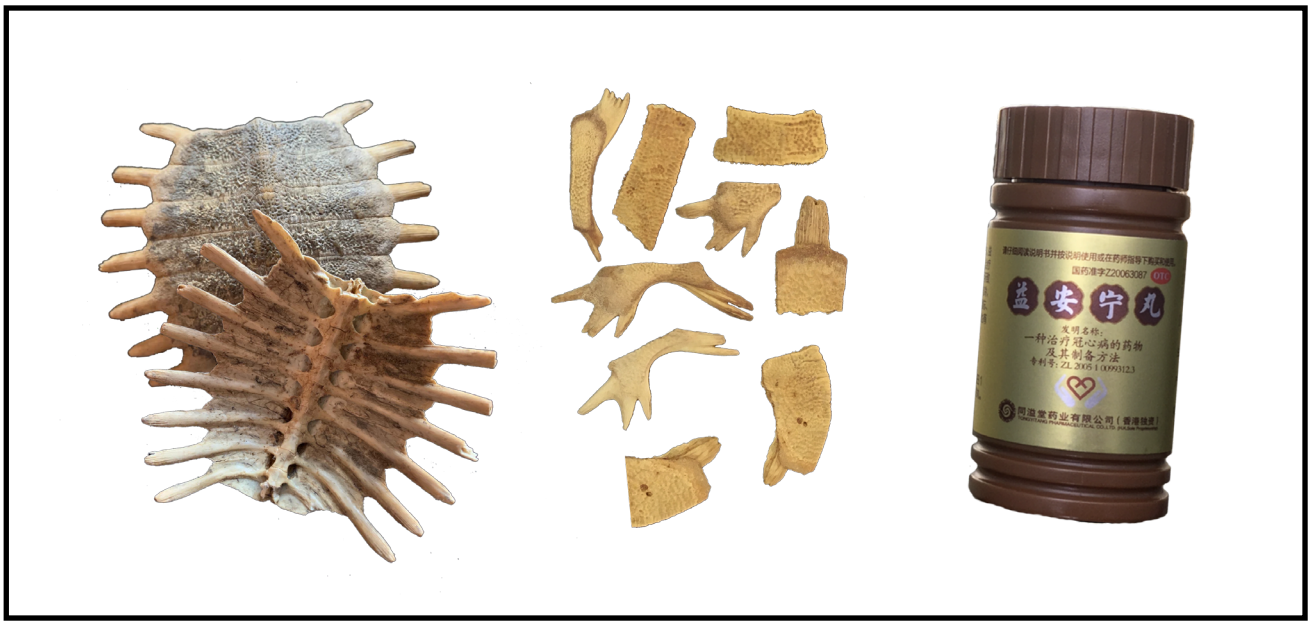


Figure 26

Shells traded for consumption as loose, broken, or powdered material with scutes absent can be especially challenging to identify to species since the color, pattern, and shape of the original shells can become more difficult if not impossible to confirm.

Artwork, souvenirs and musical instruments

The majority of shells traded for art, souvenirs, and musical instruments are taken from sea turtles, but other species of tortoises and turtles are also sometimes used. Usually, the whole shell or an intact plastron or carapace is traded for these purposes (Figures 27 and 28).

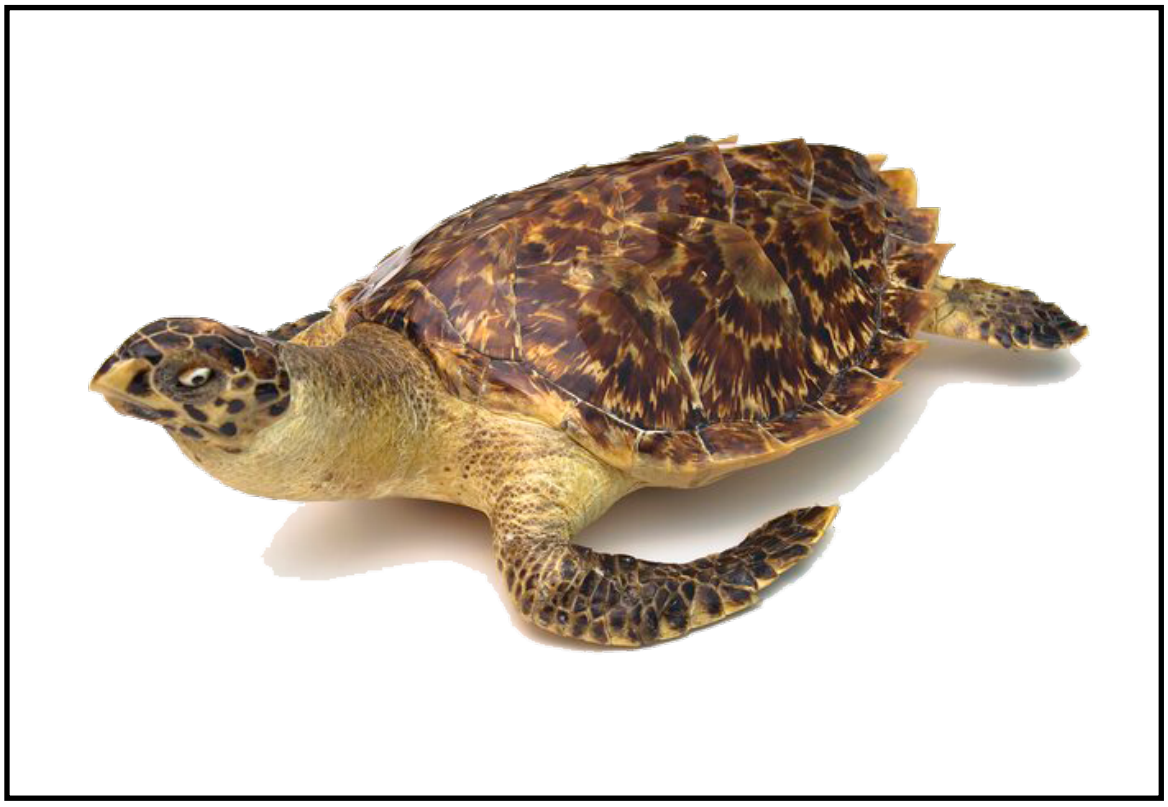


Figure 27 Taxidermy Hawksbill Sea Turtle (*Eretmochelys imbricata).*

Figure 28 Guitar made from shell of Green Sea Turtle (*Chelonia mydas).*

Shells are also painted and decorated and sold as artwork or souvenirs (Figures 29 - 32). This can make it particularly challenging to identify the species when certain diagnostic features become obscured, such as the original colors and patterns. In these instances, the shape of the shell becomes an important feature to closely examine.

Figure 29 Painted turtle shells (plastra) at souvenir shop in Africa.

Figure 30 Painted turtle shells (carapace) at souvenir shop in Africa.

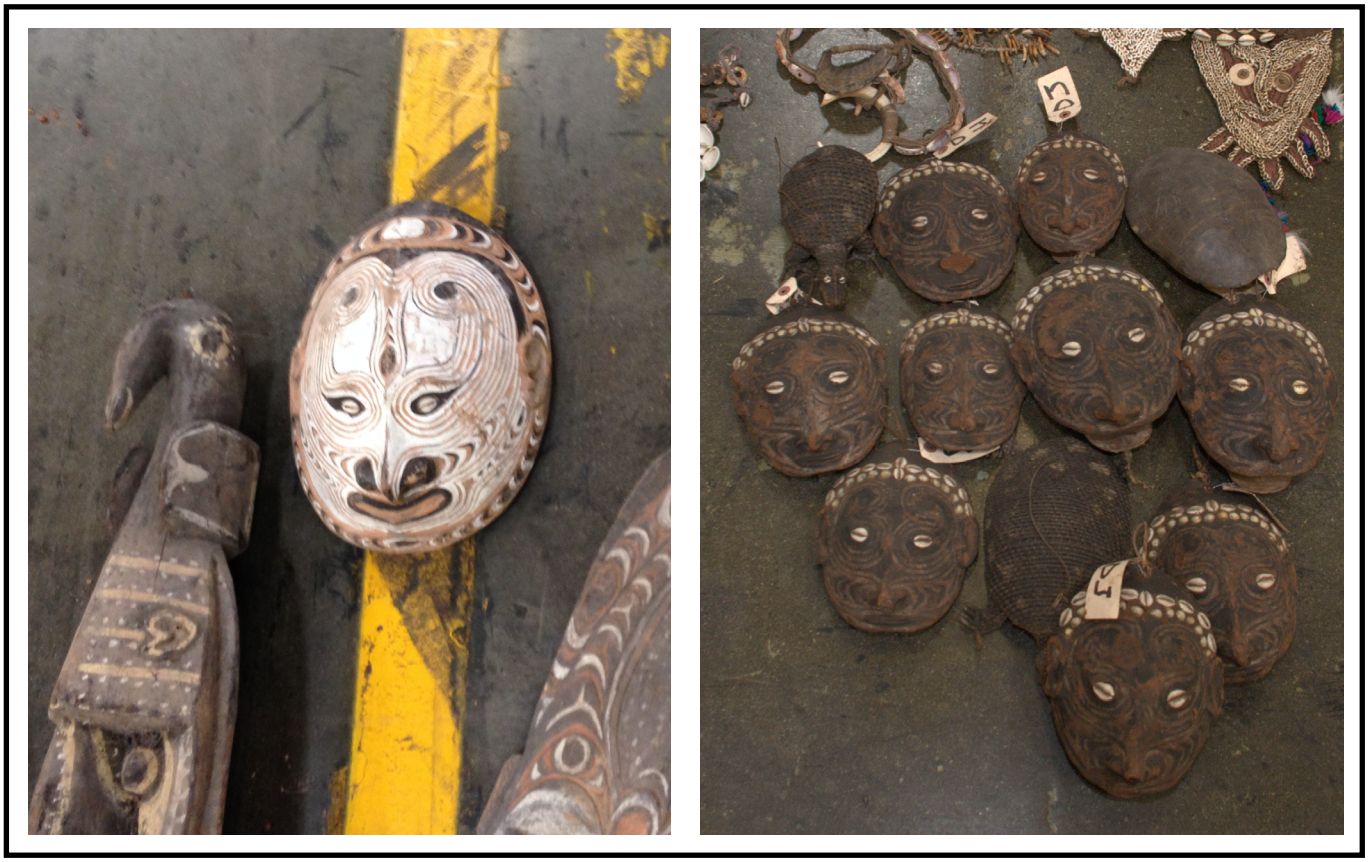


Figure 31 Masks made from freshwater turtle shells (possibly *Elseya novaeguineae*), painted and adorned with cowrie shells from Papua New Guinea.

Figure 32 Tortoise shell mask (*Indotestudo elongata*) from Nepal.

Jewelry and household decorations

Sea turtle scutes are commonly traded as jewelry (Figures 33 and 34) and also used as inlay in antique furniture (Figure 35). Most of this trade involves just two species: Hawksbill Sea Turtle (*Eretmochelys imbricata*) and Green Sea Turtle (*Chelonia mydas*). Scutes taken from the Hawksbill are usually thicker and can be used for jewelry and other decorations, whereas scutes from Green Sea Turtles are thinner and more likely to be used as inlay material for furniture (B. Baker pers. comm. 2020). Objects made from sea turtle scutes are commonly called “tortoiseshell” or “bekko” when traded and, with careful heating, these scutes can be twisted, curved, and molded into different shapes.

Figure 33 Bracelets and other jewelry made from sea turtle scutes.

Identification Tip

Turtle jewelry made from the scutes can be easily confused with an abundance of plastic imitations, as well as cow or buffalo horn, or coconut shell. Plastic or resin imitation tortoiseshell can be quickly and easily identified from that of genuine sea turtle shell by touching the surface of the material with a pin heated over a flame. If it is made from wildlife, the smell is often similar to that of burning hair, but if synthetic it will smell of burning plastic.

A helpful resource for identifying genuine sea turtle scute jewelry and other souvenirs can be found at the SeeTurtles.org website.

Figure 34 Eyeglasses made from sea turtle scutes and labeled as “tortoiseshell”.

Many auction houses sell antique items that are made with sea turtle scutes, but described as “tortoiseshell” in the descriptions. Examples include small decorative boxes and mirror frames, most of which are dated from the 1700’s to the mid 1900’s. It is common for these items to also include parts of other protected wildlife species such as elephant ivory.

Figure 35 Antique box made from sea turtle scutes.

Large shipments of sea turtle scutes are sometimes traded as raw materials (Figure 36) to supply the international and domestic trades, and these large shipments can often be associated with illegal trade. Raw scutes are sometimes painted to appear like plastic sheets to help avoid detection (Figure 37). There is a particularly thriving demand for sea turtle shell products in East and Southeast Asia, where fresh material continues to be traded despite the CITES Appendix-I listings which prohibit commercial international trade and introduction from the sea in nearly all sea turtle specimens, and the presence of national laws in many countries that additionally prohibit domestic trade in both raw and finished material (van Dijk & Shepherd, 2004). When traded, sea turtle shells and scutes are also commonly referred to as “bekko”, a term for this material that originated in Asia.

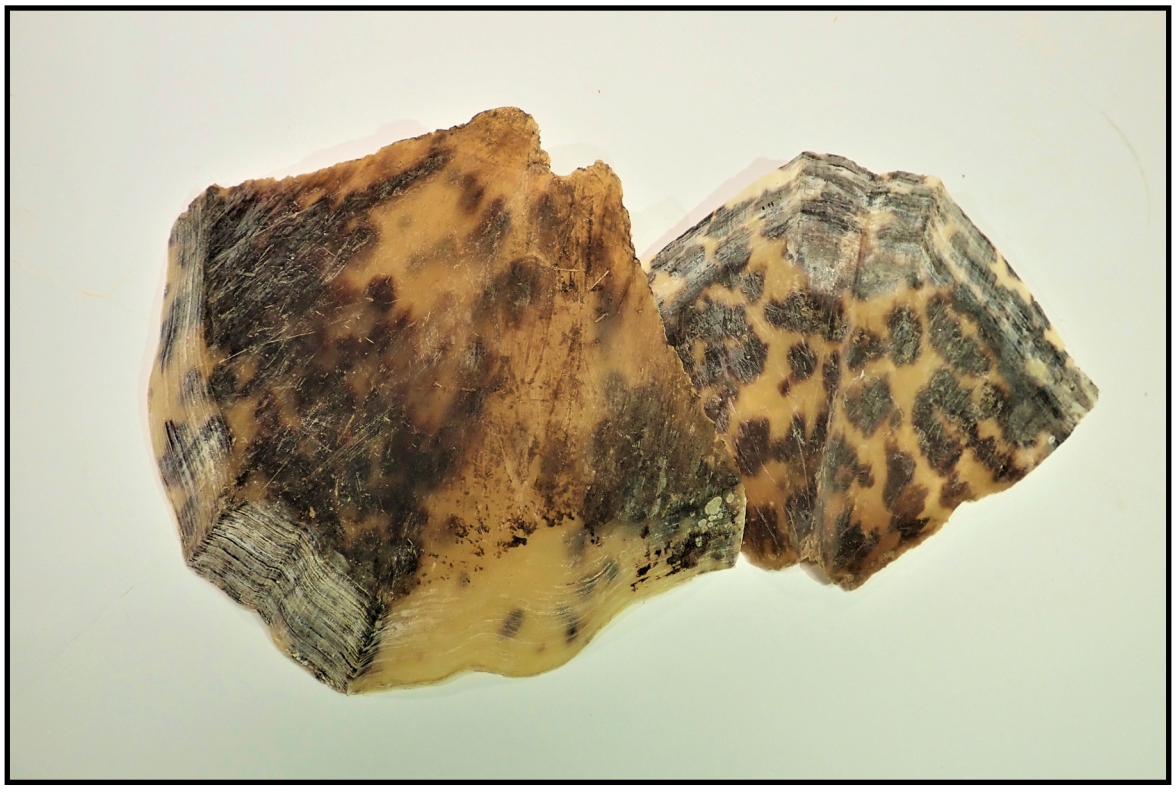


Figure 36 Sea turtle scutes.

Figure 37 Confiscated shipment of illegally traded sea turtle scutes disguised as blue plastic.

Shells used for traditional medicine

The use of shells as ingredients in traditional medicines is globally diverse, ranging from folk remedies in South America and Africa to traditional Asian medicines in East and Southeast Asia. Judging from available records of legal and illegal trade, the most common international shipments involve material typically traded for traditional Asian medicines, and this section describes some of the species that enforcement authorities are most likely to encounter.

Legal and illegal trade in traditional Asian medicines most often involves two main groups of turtles: the Asian hard-shelled freshwater and terrestrial turtles (especially *Mauremys reevesii* and *Cuora spp.*) and the softshell freshwater turtles (family *Trionychidae*). Records from the CITES Trade Database show that tortoises (family *Testudinidae*) are also traded for this purpose, but the majority of these records did not include species information.

It is important to note that in traditional Asian medicine, the words tortoise and turtle are often used interchangeably. For this reason, it is plausible that certain records of trade reported to involve material from the tortoise family *Testudinidae* may have instead involved species in a different family, if the recording of "tortoise" was based on a packaging label or associated commercial documents. This is important to remember because all species in the family *Testudinidae* are CITES-listed (in either App. I or II), whereas a variety of species in other families are not, and this detail may affect which trade regulations a wildlife law enforcement officer should enforce.

Morphological examination and genetic sampling of material from these shipments can help confirm the diversity of species traded as Asian medicinal ingredients, both legally and illegally, in comparison to the names printed on accompanying packaging labels

and invoices. The following are several species and groups of turtles most commonly used as ingredients in traditional Asian medicines, according to wildlife trade records, commercial documents and inspections by law enforcement officers.

Asian Hard-shelled Freshwater Turtles (*Geoemydidae*)

The Chinese Pond Turtle (*Mauremys reevesii*) (Figures 38 and 39) and other similar species are commonly legally and illegally traded both as whole shells or separated pieces (Figure 41), and with or without scutes still attached. This material is often labeled as “Plastrum Testudinis” or “Gui Ban” (龜板).

Figure 38 Chinese Pond Turtle (*Mauremys reevesii*).

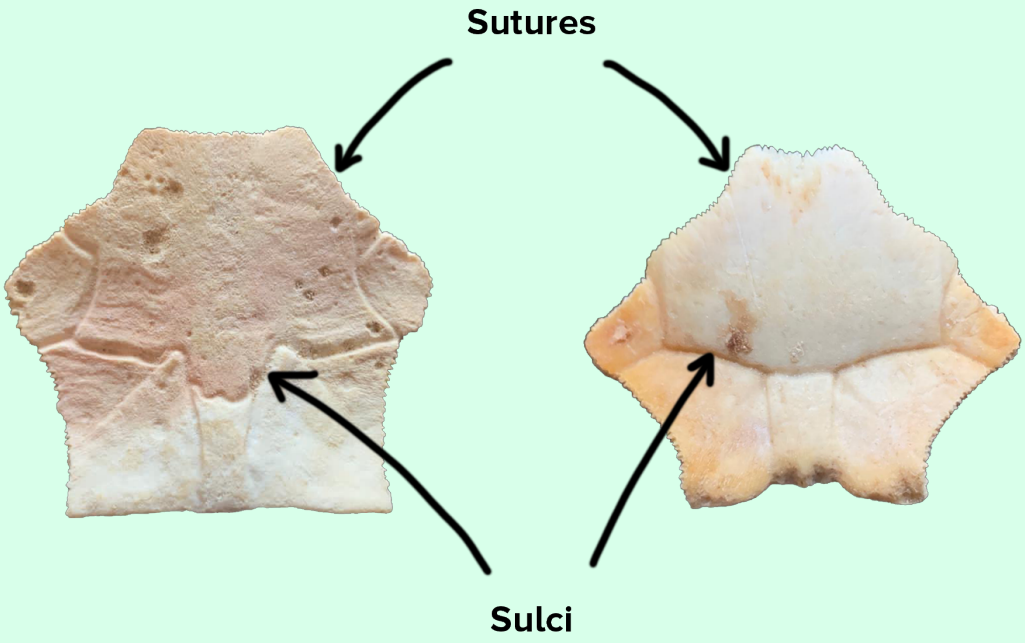
Figure 39 Plastron of a Chinese Pond Turtle (*Mauremys reevesii*).

Figure 40 Although the shells of *Mauremys* species are highly traded, a variety of other turtles are traded for the same purpose, like these plastra of *Trachemys* spp. with scutes still attached at a market in Hong Kong.

Figure 41 Pieces of mixed Testudine “Gui Ban” (龜板) bone that were separated along the bone sutures and show sulci where scutes were removed (e.g. top center).

Identification Tip

Examine fragments of bone for sulci which are the indentation lines marking where scutes were previously attached to the bone. If you have loose fragments of plate-like bones, check also for jagged edges where two bone plates had been sutured. If they show these features there is a good chance they are from the shell of a turtle. This applies generally to all turtles. The only other commonly traded wildlife items that show similar sutures are animal skulls.



The Chinese Three-striped Box Turtle *(Cuora trifasciata)* (Figure 42) and possibly additional similar species (Figures 43 and 44) are often labelled as “Golden Coin Turtle” when traded. It is commonly traded as a processed product, boiled, powdered or as a medicinal jelly dessert called “guilinggao” (龟苓膏) but might also show up in the medicinal trade as whole or crushed plastron (see Chapter 2.7 for more information).

Figure 42 Golden Coin Turtle (*Cuora trifasciata).*

Figure 43 Amboina Box Turtle (*Cuora amboinensis).*

Figure 44 Yellow Pond Turtle (*Mauremys mutica).*

Identification Tip: Asian Box Turtles (*Cuora* species)

Examine the color and shape of the plastron to differentiate between the highly coveted Chinese Three-striped Box Turtle (*Cuora trifasciata*) (left) and some of the more readily available substitute species, such as the South Asian Box Turtle (*Cuora amboinensis*) (right). Note the dark brown to nearly black coloration covering most of the plastron of *C. trifasciata* compared to the presence of one dark spot on each scute of *C. amboinensis* against a lighter colored background. Pay special attention for a pronounced central notch in the bottom edge of the plastron where the two anal scutes meet on *C. trifasciata*. Some of the species in the genus Cuora which lack this pronounced notch include *C. amboinensis, C. flavomarginata*, and *C. galbinifrons.*

Cuora trifasciata

Cuora amboinensis

One species of *Cuora* in particular that appears very similar in both color and pattern to the plastron of *C. trifasciata* is *C. mccordi*, with the main difference being that *C. mccordi* does not show this pronounced notch between the anal scutes. Note that if scutes are absent from traded shells, all signs of color and pattern may also be absent.

All *Cuora* species have a distinct horizontal hinge anterior to the middle of the plastron. This hinge is not moveable in a dried plastron, but it can be recognised as a non-sutured joint. This hinge will be absent from the plastra of other highly traded Asian turtles, such as *Mauremys* spp.

Figure 45 Plastra of the Indian Roofed Turtle (*Pangshura tecta*) sold at a market in East Asia.

Figure 46 Carapace and plastra of freshwater turtles at a market in China.

Softshell turtles (*Trionychidae*)

The carapace of the Chinese Softshell Turtle (*Pelodiscus sinensis*) and potentially other members of the *Trionychidae* family (such as *Nilssonia* spp. and *Apalone* spp.) are often traded as medicinal ingredients under the names “Carapax Trionycis” and “Trionyx Sinensis”. According to international wildlife trade records, the majority of trade in this species has been performed legally. This material is sometimes traded as whole carapace with dried skin still attached (Figure 47), or as cleaned, disarticulated intact and broken plates of bone (Figure 48). It is also sometimes traded as shell ground into a powdered form or already prepared into medicines.

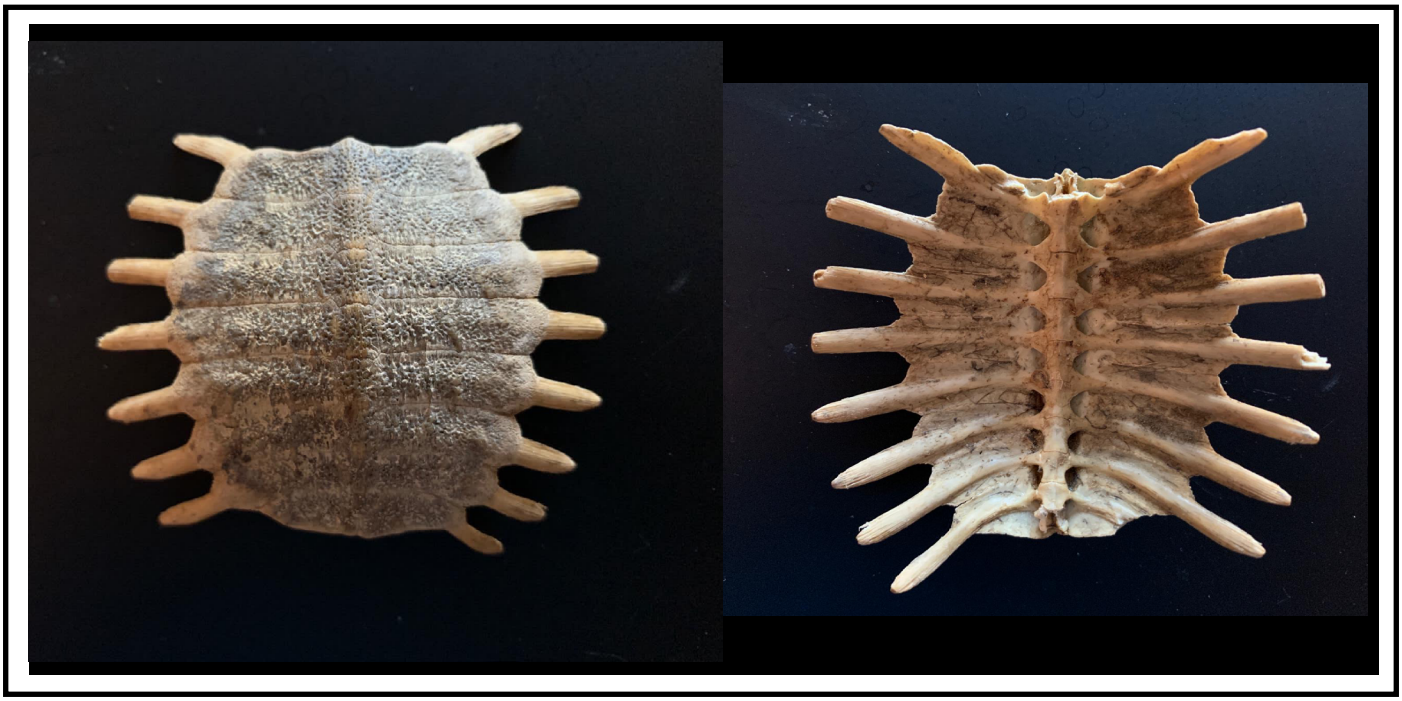


Figure 47 Chinese softshell turtle (*Pelodiscus sinensis*): intact carapace from a juvenile animal with some skin still attached. Dorsal surface (left) and ventral surface (right).

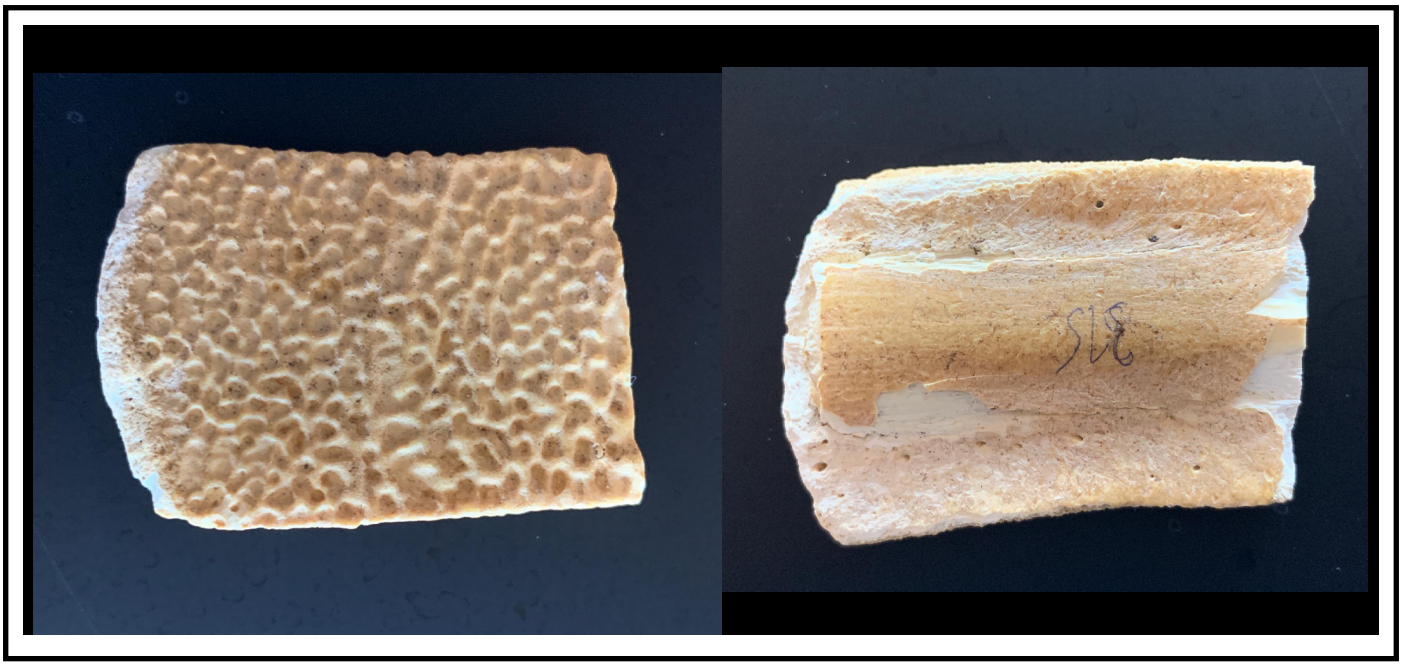


Figure 48 Chinese softshell turtle (*Pelodiscus sinensis*): disarticulated bone plate from the carapace of a mature animal. Dorsal surface (left) and ventral surface (right).

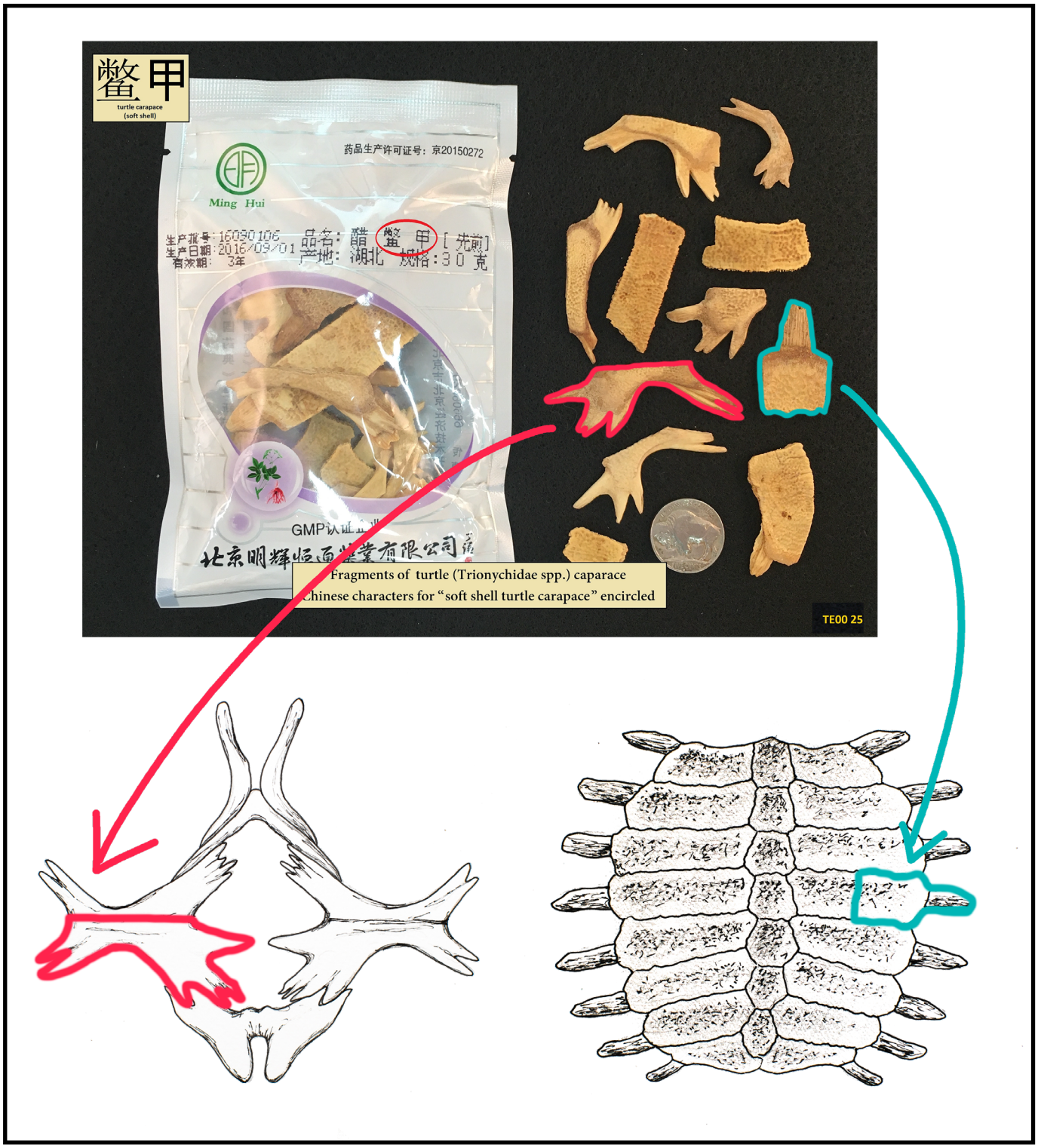
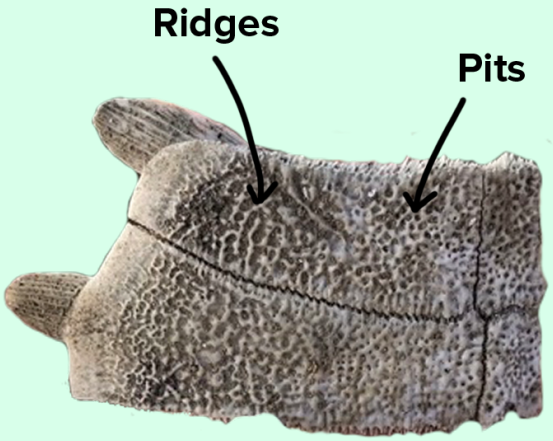


Figure 49 Broken bone fragments of softshell turtles (*Trionychidae*) from a commercial package sold for use in traditional medicines. Note that this item is marketed as carapace bones, but the jagged irregular pieces show that plastron bones (red outline) have been mixed with those from the carapace (blue outline).

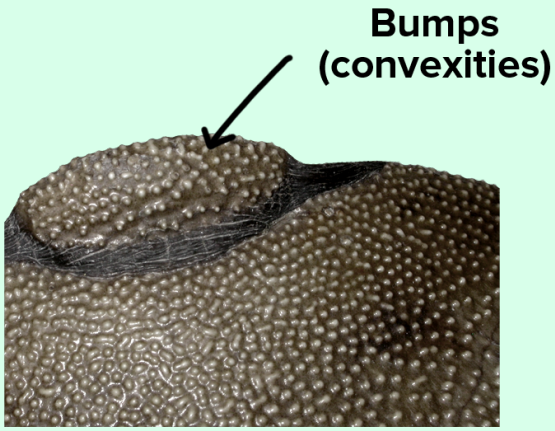
Identification Tip: Softshell Turtles

Softshell turtles have a distinctive texture on the dorsal surface of the carapace bones, looking like dimples, pits or grooves, and making them easily identifiable from other families of turtles. No other group of turtles has this texture on the dorsal surface of carapace bones.

These can be further distinguished as the **Trionychine** softshells (including *Apalone, Pelochelys* and *Pelodiscus*) which have interconnecting fine ridges that isolate the pits or grooves; or the **Cyclanorbine** softshells (including *Cyclanorbis, Cycloderma* and *Lissemys*) which instead have rounded bumps that are called convexities.



Chinese Softshell Turtle
Pelodiscus sinensis



Indian Flapshell Turtle
Lissemys punctata

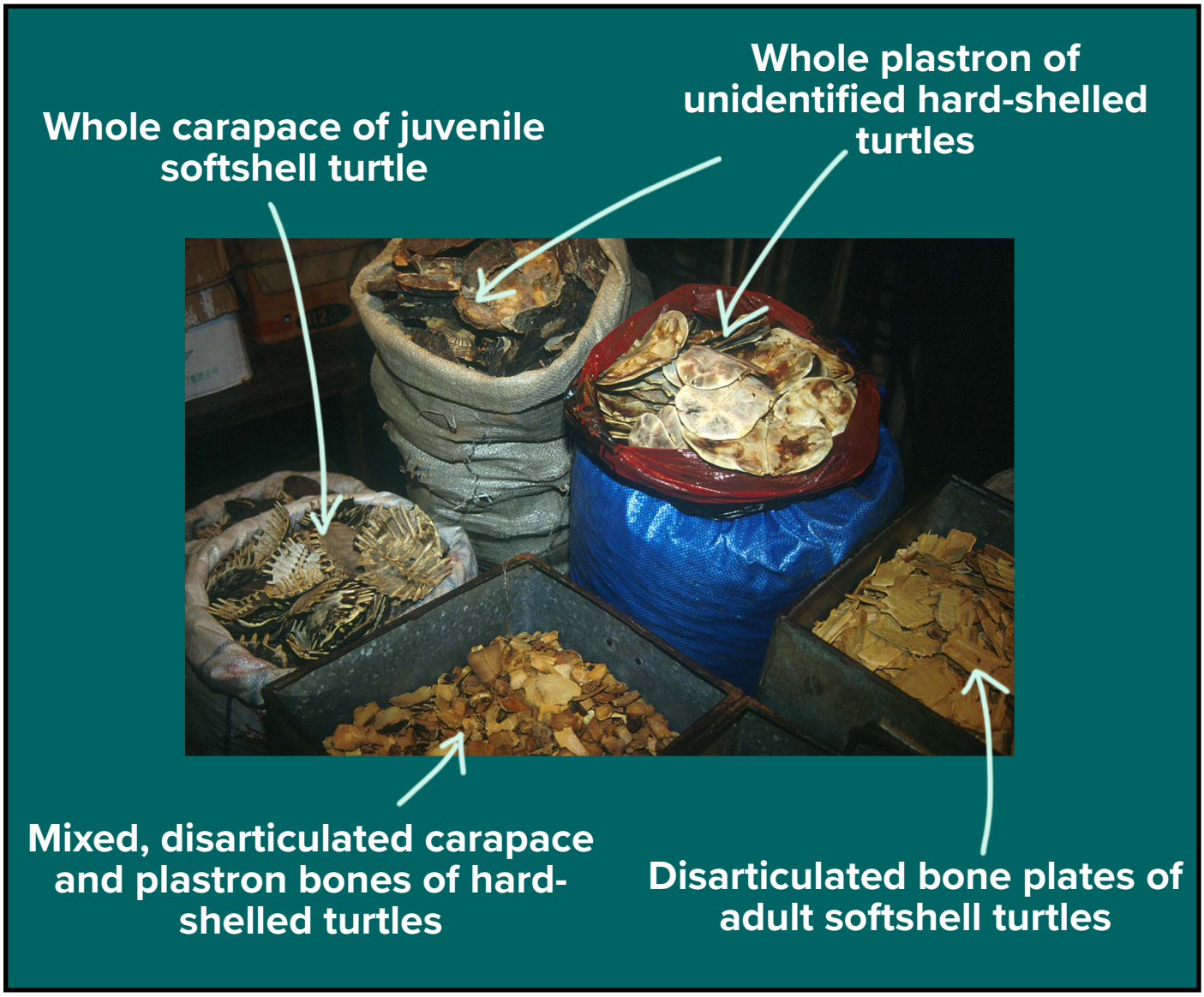


Figure 50 Various pieces of softshell and hard-shelled turtle shells at a market.

For further information on the use of tortoise and turtle shells and bones as medicinal ingredients in pills, powders, plasters, or jelly form, and for a key to Chinese characters and example illustrations of packaging labels, please refer to Chapter 2.7.

CHAPTER 2.2: TORTOISE AND TURTLE **BONES**

Figure 51 Bones of a Zambezi Flapshell Turtle (*Cycloderma frenatum).*

Limb bones

Bones from the arms, legs, and tails of tortoises and turtles are not often traded, but when they are, the limb bones tend to be mixed together with the shell bones. Limb bones are also sometimes traded as a craft material used in jewelry. Although most of the tortoise and turtle bones commonly traded internationally come from either the carapace or plastron, skulls also occasionally appear in the trade as souvenirs or curios.

Skulls

There is a small but thriving collectors' trade in animal skulls, including those of tortoises and turtles, much of which is conducted online and shipped by mail. Tortoise and turtle skulls do not have teeth and instead have a beak-like jaw structure (Figure 52). Some may even appear bird-like, particularly the snapping turtles, but the bones of turtle skulls are comparatively much thicker and heavier.

Figure 52 Skull of an Olive Ridley Sea Turtle (*Lepidochelys olivacea)* from various angles.

Skulls of several species of tortoises and turtles have appeared in both the legal and illegal wildlife trade according to CITES Trade Database records. Skulls illegally traded have primarily included sea turtles (Figures 53 and 54), but also the Asiatic Softshell Turtle (*Amyda cartilaginea*), Alligator Snapping Turtle (*Macrochelys temminckii*) (Figure 56) and Big-headed Amazon River turtle (*Peltocephalus dumerilianus*). Meanwhile,

legal trade in tortoise and turtle skulls has also included several species of sea turtles, as well as the Leopard Tortoise (*Stigmochelys pardalis*) and Hermann's Tortoise (*Testudo hermanni*).

Figure 53 Green Sea Turtle skull *(Chelonia mydas).*

Figure 54 Loggerhead Sea Turtle skull (*Caretta caretta).*

Figure 55 Common Snapping Turtle skull *(Chelydra serpentina).*

Figure 56 Alligator Snapping Turtle skull (*Macrochelys temminckii).*

CHAPTER 2.3: TORTOISE AND TURTLE **CARTILAGE** (also known as **CALIPEE**)

Calipee is a portion of cartilage (a flexible connective tissue) found inside the lower half of a turtle's shell (i.e., the plastron) of sea turtles and softshell turtles, as well as forming the posterior margin of the carapace of softshell turtles. It is often dried before being traded, causing it to become a tough leathery material. In the past, the word calipee was primarily used to refer to parts of cartilage found in Green or Hawksbill Sea Turtles, but this trade has expanded to include material from softshell turtles in the family *Trionychidae* that have a flexible cartilaginous shell, such as *Apalone* spp., *Nilssonia* spp., and *Lissemys* spp.

Figure 57 Illegally traded turtle calipee confiscated in India.

The color of calipee varies from light beige to dark brown and the texture is tough and fibrous, similar to that of dried animal hide, but harder. Due to these characteristics, turtle calipee is sometimes traded as buffalo horn to evade detection by law enforcement officers (Horne et al. 2011).

Cartilage is collected from an animal by removing the plastron from a sea turtle or softshell turtle and then carving away the plastral bones (Figure 58). Likewise, the posterior margin of cartilage is cut and removed from the carapace of softshell turtles (Figure 59). Both of these areas of cartilage are often called calipee when traded, irrespective of the area of the body from which it may have been taken.

Figure 58 Calipee taken from the plastron of a turtle.

Figure 59 Calipee taken from the carapace of a turtle.

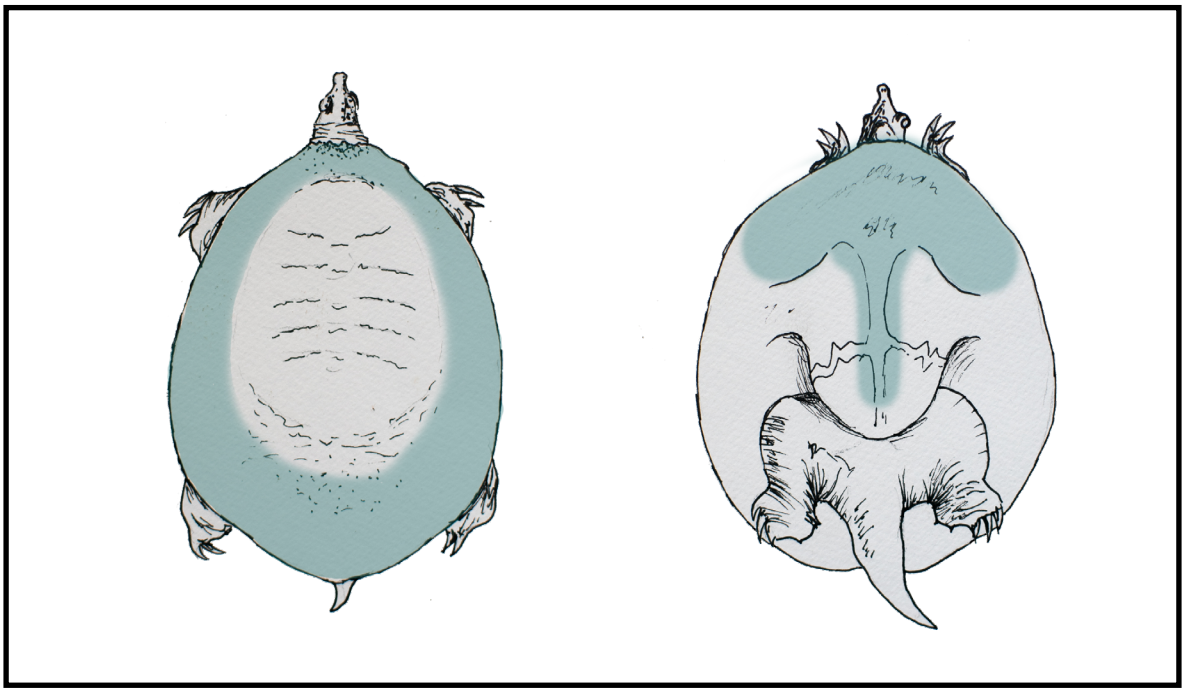


Figure 60 Shaded regions represent the areas of cartilage that are sometimes removed and traded as calipee from a softshell turtle (*Nilssonia* sp.).

Although it is sometimes possible to identify cartilage of turtles traded as calipee through genetic analysis, there is often much less DNA in cartilage compared to that found in bone or meat, and it may fall below detection limits. Still, it remains possible that the identification of turtle calipee can be confirmed with forensic laboratory support (B. Baker pers. comm. 2020).

Identification Tip: Conversion factor

1 kg of wet (fresh) calipee = 8 kgs of softshell turtle

1 kg bony shell from softshell turtles = 4 kgs softshell turtle

(R. Ghosh, pers. comm to P. P. van Dijk 2013)

CHAPTER 2.4: TORTOISE AND TURTLE **MEAT**

The identification of tortoise and freshwater turtle meat is easier to perform when whole limbs or skin with scales are still present. In the absence of these features, tortoise and freshwater turtle meat can be very difficult to identify without submitting samples to a laboratory for genetic analysis. Labels with images or descriptions of the ingredients are sometimes the only clues available for initial recognition of meat that originated from a tortoise or a freshwater turtle.

Some examples of tortoises and freshwater turtles that are commonly traded as meat include the South American tortoises *Chelonoidis carbonarius* and *C. denticulatus*, snapping turtles (*Chelydridae*), softshell turtles and flapshell turtles (*Trionychidae*). The meat is traded both fresh and frozen, and either as whole animals, butchered legs and arms, or as fully processed de-skinned and de-boned portions of meat. Commercially processed turtle soup containing chunks of meat is also canned and traded internationally.

Figure 61 Snail-eating Turtles (*Malayemys subtrijuga*) in Cambodia.

Meat and developing eggs are sometimes sold together, as seen in Figure 61, where the turtles' carapace is cut away to reveal the presence of unshelled eggs inside the body cavity.

Figure 62 Left: Caiman (*Caiman* sp.). Right: Red-footed Tortoise (*Chelonoidis carbonaria*) in Quitos, Peru.

In Figure 62, note the difference between the arrangement of scales on the arms and legs of caiman on the left and Red-footed Tortoise (*Chelonoidis carbonarius*) on the right. In tortoises, the scales are adjoining, but rounded and in a honeycomb arrangement, as distinct from the grid pattern of arrangement in crocodilians. The reason the tortoise scales appear separated in Figure 62 is because there's a central yellow dot on each of the larger, otherwise black, scales.

Flapshell Turtles such as *Lissemys punctata* are often traded in India and Bangladesh as whole or butchered turtles for meat, both fresh and frozen, as shown in Figure 63.

Figure 63 Flapshell Turtles (*Lissemys punctata*) traded in India as whole or butchered turtles for meat.

Figure 64 Red-eared Slider (*Trachemys scripta elegans*) meat sold at a market in North America. Pairs of hind legs are still attached at the pelvis (top), and front legs are each individually separated (bottom).

Commercially packaged meat is often sold with descriptive labels, as shown in Figure 65. This is important to examine, because if scales or claws are not present, this may be the only indication that a portion of meat was derived from a tortoise or turtle.

Figure 65 Common Snapping Turtle (*Chelydra serpentina*) meat sold at a seafood market in North America identified by the packaging.

Commercially processed foods made from turtles include items such as canned turtle soup (Figures 66 - 68), and both canned and dry-powdered packets of turtle jelly called “guilinggao” (龟苓膏)(Figure 69).

In the United States, the Common Snapping Turtle (*Chelydra serpentina*) is the principal species presently used for turtle soup. In earlier decades, the Alligator Snapping Turtle (*Macrochelys temminckii*) was used as well as sea turtles (Figure 66). The soup is also referred to as snapper turtle soup, or simply snapper soup (Figures 67 and 68). This is not to be confused with red snapper soup, which is made from a marine fish called the red snapper in the United States.

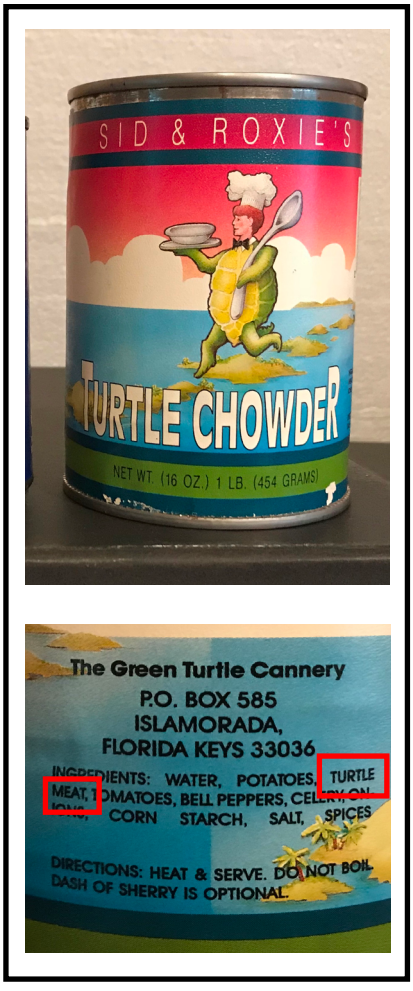


Figure 66 Green Sea Turtle chowder

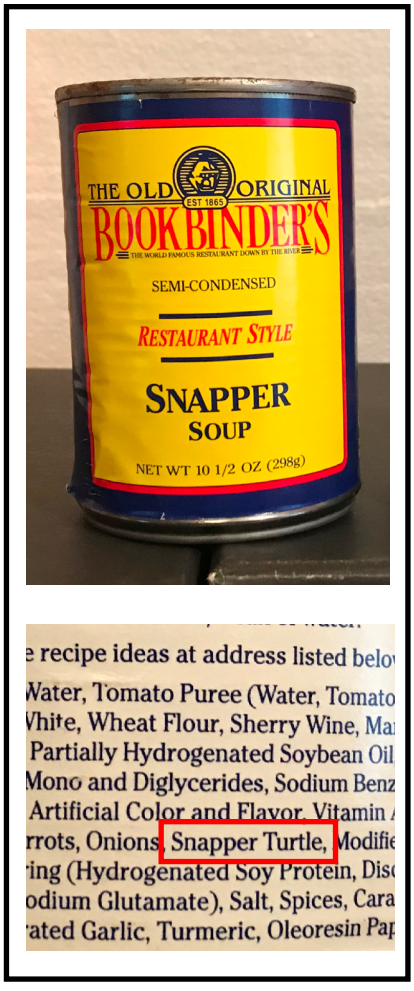


Figure 67 Snapping Turtle soup

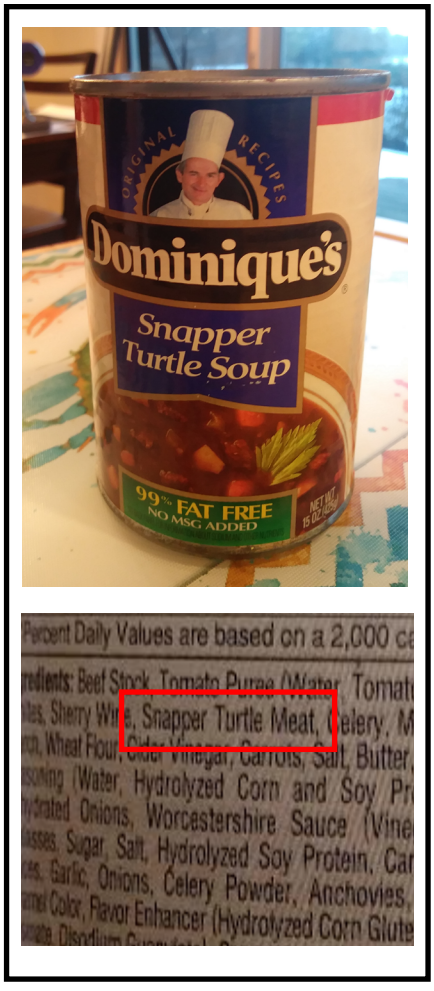


Figure 68 Snapping Turtle soup

It is important to note that guilinggao, a medicinal jelly dessert, has traditionally included turtle shell as an ingredient, although not all contemporary mass-produced versions of this product necessarily contain turtle shell.

Figure 69 Packet of guilinggao jelly powder.

CHAPTER 2.5: TORTOISE AND TURTLE **EGGS**

Figure 70 Yellow-spotted River Turtle eggs (*Podocnemis unifilis*).

Tortoise and turtle eggs are round or oval in shape, with a flexible leathery or hard shell. It is not often possible to distinguish between different species of eggs based only on their appearances. In fact, individuals of some turtle species such as the Yellow-spotted River Turtle (*Podocnemis unifilis*) will lay different shaped eggs depending on the size and maturity of the animal. Younger, smaller individuals tend to lay oval eggs, whereas larger females are more likely to lay round eggs.

Many other reptiles also have either leathery or hard, round or oval eggs. It can, therefore, be difficult to tell tortoise and turtle eggs apart from those of other reptiles, as shown in Figure 71.

Black Racer Snake
Coluber constrictor

Saltwater Crocodile
Crocodylus porosus

Five-Lined Skink
Plestiodon fasciatus

Mourning Gecko
Lepidodactylus lugubris

Figure 71

The trade in sea turtle eggs for food and medicine (Figure 72) is a relatively well-known activity compared to that from other turtles, both due to the high global demand for sea turtle eggs and also because the families *Cheloniidae* and *Dermochelyidae* have been listed in Appendix I of CITES since 1981 and 1977, respectively, prohibiting international commercial trade in their eggs. Despite prohibitions, international illegal trade in sea turtle eggs continues. Meanwhile, some amount of domestic harvest, sale and consumption has remained legal under strict regulation in certain countries such as Malaysia and Costa Rica (Jani et al. 2020).

Figure 72 Sea turtle eggs for sale.

While the illegal trade in sea turtle eggs for food and medicine often draws considerable media attention, it is important to remember that freshwater and terrestrial turtle eggs are also collected and sold for consumption around the world. This occurs both legally and illegally, and can be at significant scale, particularly for the riverine *Podocnemis* species in South America, the *Batagur* species in Asia, and *Carettochelys insculpta* in New Guinea.

According to the CITES Trade Database, the majority of both legal and illegal international trade in turtle eggs has involved those of sea turtles and the Central American River Turtle (*Dermatemys mawii*) (Figure 75). Illegal trade in eggs has also been recorded in Side-necked Turtles (*Podocnemididae*) (Figures 76 and 77). Legal trade in eggs of CITES-listed species has included Yellow-footed Tortoises (*Chelonoidis denticulatus*) and Common Snapping Turtles (*Chelydra serpentina*) (Figure 78).

The figures below show some of the general shape, texture, and size characteristics of tortoise and turtle eggs, including some of those found in trade.

Figure 73

Olive Ridley Sea Turtle
(*Leptochelys olivacea*)

Round, leathery

32.1 - 44.7 mm
(Ernst & Lovich 2009)

Figure 74

Leatherback Sea Turtle
(Dermochelys coriacea)

Round, leathery

45.4 - 65mm
(Hirth 1993)

Figure 75

Central American River Turtle
(*Dermatemys mawii)*

Oval, brittle

61.6 mm width
x 35.8 mm length
(Jennings et al. 2020)

Figure 76

South American River Turtle
(Podocnemis expansa)

Round, leathery

c. 50mm / 40g
(Rivas 2015)

Figure 77

Yellow-spotted River Turtle
(Podocnemis unifilis)

Oval or round, leathery

47mm length x 32 mm width
(Escalona et al. 2018)

Figure 78

Common Snapping Turtle
(Chelydra serpentina)

Round

22.8 - 33.0mm
(Ernst & Lovich 2009)

Figure 79

Red-footed Tortoise
(Chelonoidis carbonarius)

Slightly oval, brittle

48mm x 43mm / 40-50g
(Highfield 2020)

Figure 80

Diamondback Terrapin
(Malaclemys terrapin)

Oval, leathery

c. 25mm length
(Park 2000)

CHAPTER 2.6: TORTOISE AND TURTLE LEATHER

Figure 81 Common Snapping Turtle leather (*Chelydra serpentina*).

Figure 82 Sea turtle leather (*Chelonoiidae*).

Many different types of reptiles are used to make exotic leathers, including crocodilians, lizards, snakes, and turtles. According to CITES Trade Database records, the majority of internationally traded tortoise or turtle leather shipments has involved material derived from sea turtles. All sea turtle species are listed in CITES Appendix I, and

commercial trade is generally prohibited, but their large size and unique scale patterns makes them highly desirable for use in leather products such as boots and bags. Some local and domestic production continues in a few countries, which is legal, but buying such leather goods as travel souvenirs and internationally transporting them home is often illegal. Additionally, these trade records show some legal international trade in turtle leather derived from CITES Appendix-III listed North American Map Turtles (*Graptemys spp.*). Leather from Common Snapping Turtles (*Chelydra serpentina*), also listed in CITES Appendix III, is being advertised online for sale in the United States. It has not yet appeared in the international market but can be expected in the future.

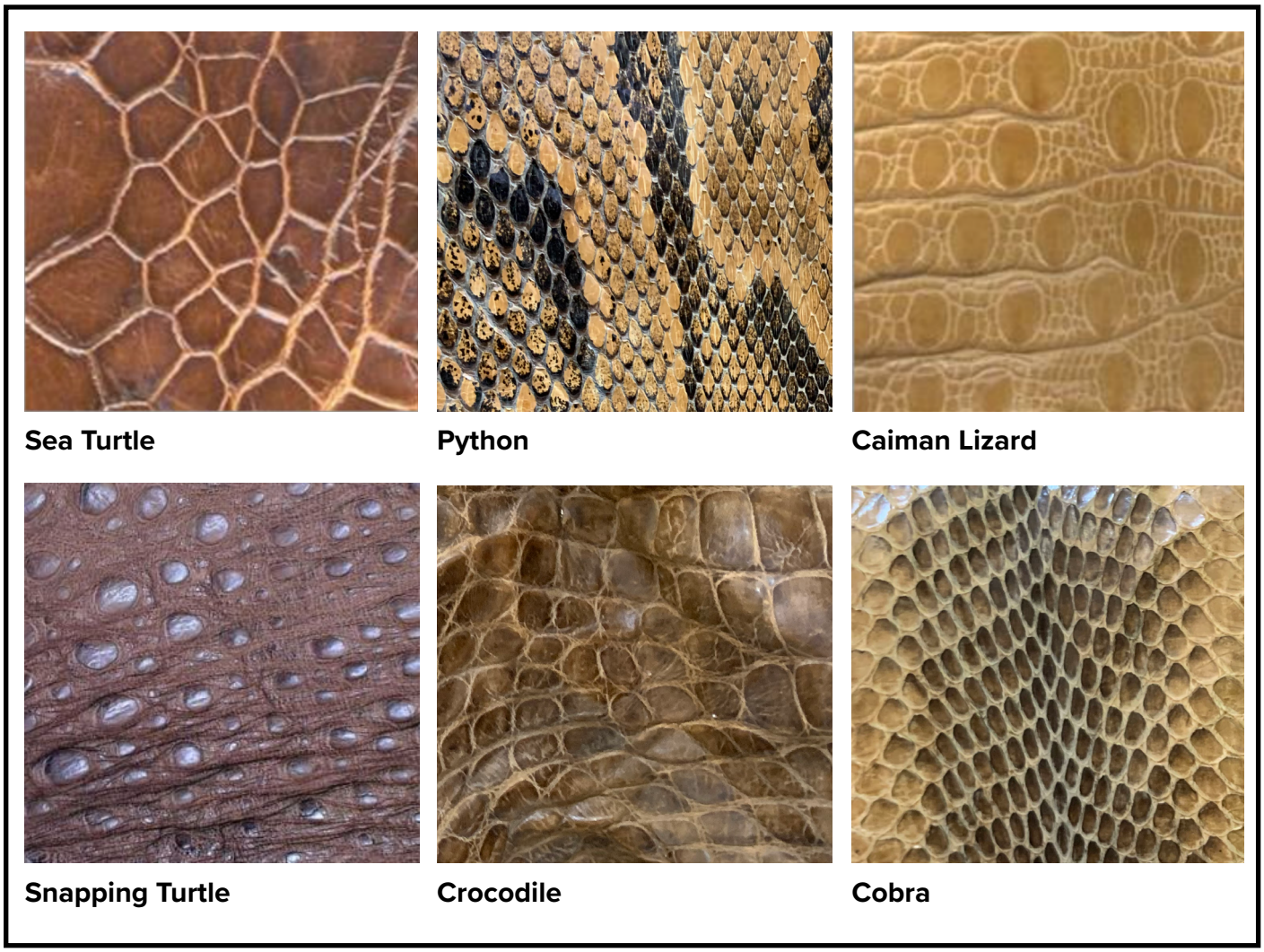


Figure 83 Diversity of scale patterns among different kinds of reptile leather.

Tortoise and turtle leather may be confused with that from other reptiles, and particularly with the underside of caimans, alligators, and crocodiles. Both groups of reptiles have scales that are generally circular or square in appearance, but can be highly variable and irregular depending on the part of the body from where the skin was removed (Figures 84 and 85). In general, crocodile leather has scales in a linear, squarish, grid-like pattern, whereas the scales on turtle leather are akin to 'crazy paving' (irregular size and shape) patterns. Crocodilian skins have areas of irregular scales, but they usually adjoin areas with typical grid-like scale patterns (Figure 85). Lizard and snake leather generally has very regular linear patterns of the actual scales (if not the pigmentation, which can have very different patterns, as shown by the python leather image in Figure 83).

Figure 84 Variation in sea turtle (*Cheloniidae*) leather patterns.

Figure 85 Variation in crocodile (*Crocodylidae*) leather patterns.

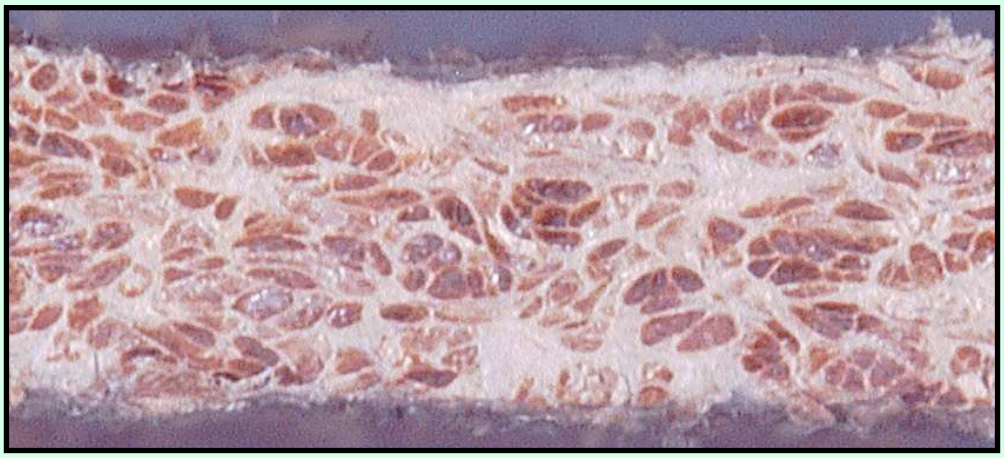
It should be noted that leathers are often dyed, so the color of the skin and scales is not always a reliable distinguishing feature that can be used to help identify the species.

Figure 86 Different colors of dyed leather swatches created from Common Snapping Turtle (*Chelydra serpentina*).

Leather derived from mammals, such as cows, can be embossed with patterns to adopt the appearances and textures of genuine reptile leather and may look nearly identical from the surface. Sometimes, hair follicles in leather made from a mammal will remain visible as tiny dimples in the surface of the leather and can be seen through a hand lens as a quick way to rule out the presence of tortoise or turtle leather, or other reptilian leather. Still, the absence of hair follicles can be misleading because it is possible for the dyes, tanning, and embossment to cover and hide these tiny dimple marks. One unmistakable way that reptile leather can be told apart from cow leather is by close examination of the cross section of a sample, aided by a hand lens or microscope. If necessary, DNA analysis could also be drawn upon to assist in further identifying the species that was used to create the leather.

Identification tip: Leather cross section

Cross-section of sea turtle (*Cheloniidae*) leather.



Cross-section of domesticated cow (*Bos taurus*) leather.

In the above pictures you can see a cross section magnified image of sea turtle leather compared to split grain cow leather where the top layer with hair follicles has been removed as part of the manufacturing process. Note how irregular the grain pattern appears compared to the regular structure visible in sea turtle skin (which also applies to reptiles in general and especially crocodilians) (B. Baker pers. comm. 2020).

Leather products

Leather from sea turtles, snapping turtles, and possibly others are processed into products that include but are not limited to boots, bags, belts, watch straps and wallets.

Figure 87 Sea turtle (*Cheloniidae*) leather boot.

Figure 88 Common Snapping Turtle (*Chelydra serpentina*) leather boot.

Figure 89 Common Snapping Turtle (*Chelydra serpentina*) leather wallet.

CHAPTER 2.7: MEDICINE

Tortoise and freshwater turtle shell, bone, and cartilage are commonly traded ingredients in traditional medicines around the world, and particularly in traditional Asian medicines. These specimens are traded both as raw ingredients and as finished products ready for consumption. When traded raw, it may be possible to recognize whole or partially intact pieces of the carapace or plastron (see Chapter 2.1), but processed medicines containing crushed or powdered specimens are more challenging to identify. Many medicinal products containing tortoise or turtle parts or derivatives, also include additional wildlife ingredients that may require permits for domestic and international trade, or may be altogether prohibited from being traded commercially, such as tiger bone, bile from certain species of bears, and pangolin scales, as well as regulated plants like Saussurea, Hoodia, and ginseng. Therefore, these products may warrant careful inspection for the presence of other regulated species in addition to the presence of tortoise or freshwater turtle material.

Identification Tip: Chinese Characters

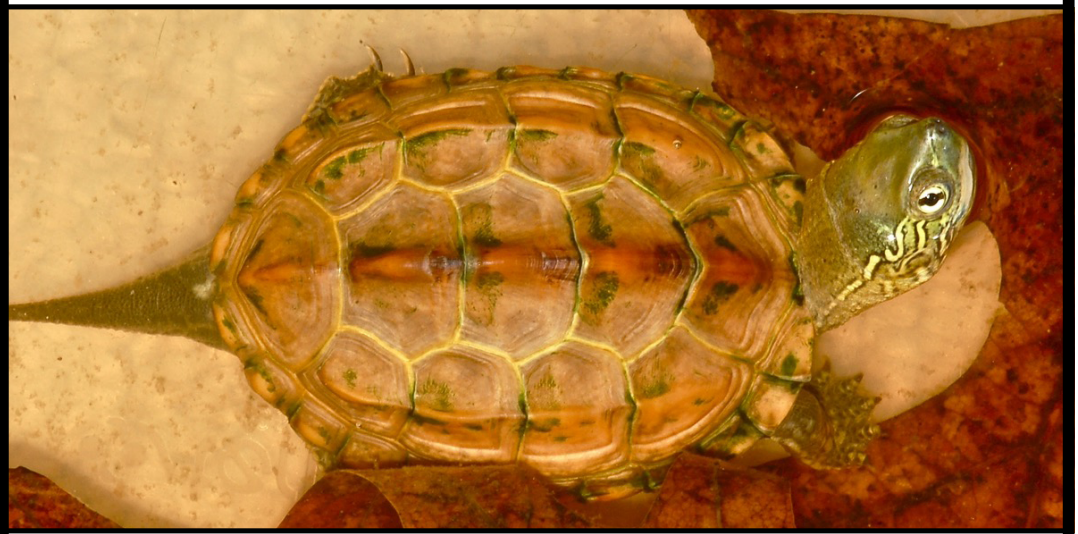
ENGLISH	PINYIN	CHINESE SIMPLE	CHINESE TRADITIONAL	TRADE/ ROMAN
TURTLE or TORTOISE	GUI	龟	龜	TESTUDINES
BONE	GU	骨	骨	OS
TURTLE or TORTOISE PLASTRON (hard-shelled)	GUI BAN	龟板	龜板	PLASTRUM TESTUDINES
TURTLE CARAPACE (softshell)	BIE JIA	鳖甲	鱉甲	CARAPAX TRIONYCIS
TURTLE or TORTOISE CARAPACE (hard-shelled)	GUI JIA	龟甲	龜甲	CARAPAX TESTUDINES

Sometimes the only preliminary information available to identify the presence of wildlife as an ingredient in a medicinal product is the packaging label, and DNA analysis may be needed to confirm whether it is indeed present and if possible, which species. At times, a product may be advertised to contain an ingredient that was either not included or has been substituted with a species found to be easier or cheaper to acquire. For instance, material labeled to contain a rare species like the Golden Coin Turtle (*Cuora trifasciata*) may instead have included the more accessible and lower commercial value Amboina Box Turtle (*Cuora amboinensis*) or Yellow Pond Turtle (*Mauremys mutica*). See Chapter 2.1 for more identification tips when whole shells or shell pieces are present.

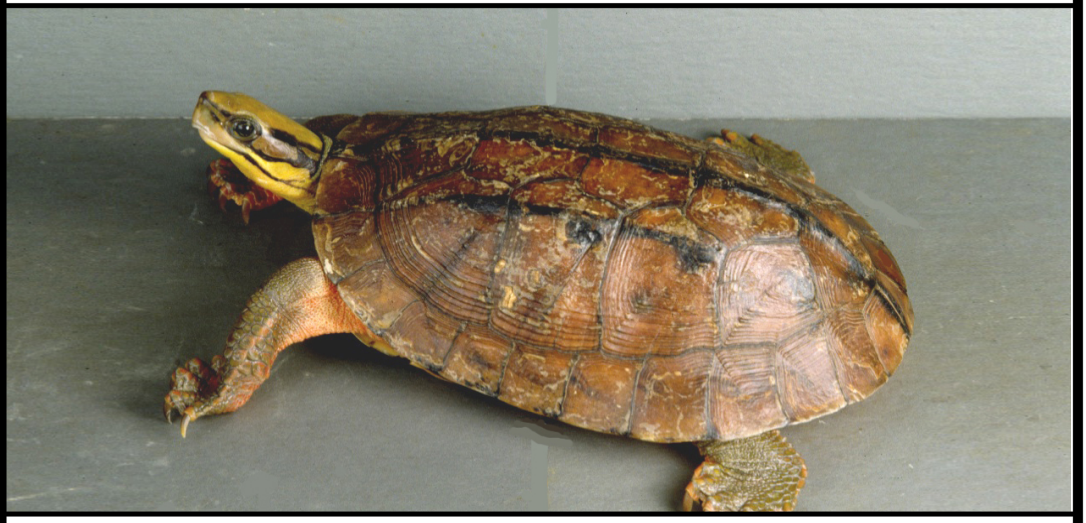
It is important to note that in traditional Asian medicine, the words tortoise and turtle are often used interchangeably. For this reason, it is plausible that certain records of trade recorded to involve material from the tortoise family *Testudinidae* may have instead involved species in a different family, if the word “tortoise” was based on a packaging label or associated commercial documents. This is important to remember because all species of tortoises in the family *Testudinidae* are CITES-listed, whereas a variety of turtles in other families are not, and this detail may affect which trade regulations a wildlife law enforcement officer should enforce.

Figure 90 Pills labeled to contain “Golden Coin Turtle” (*Cuora* spp.). Note “tortoise” and “turtle’ are used interchangeably on the labels.

Species commonly used in Asian medicinals are described in the tables that follow:

Species:	**Chinese Pond Turtle (*Mauremys reevesii*)**
Part most commonly traded:	Plastron
Traded as:	Whole shell with scutes, whole without scutes, disarticulated or crushed pieces of shell, gelatin or glue, shell ground into a powder form, or prepared medicines.
Pharmaceutical name:	Plastrum Testudinis
Chinese name:	龜板
Pinyin name:	Gui Ban
Other common trade names:	Plastron Testudines, testudinis shell, tortoise plastron, Bie Jia Jiao (Turtle Carapace Glue), Gui Jia (when carapace and plastron are combined).
Live animal:	
Part traded:	

Species:	**Chinese Softshell Turtle (*Pelodiscus sinensis*) and possibly other members of the family *Trionychidae* - often sold as "*Trionyx sinensis*"**
Part most commonly traded:	Carapace (although pieces of the plastron have also been seen mixed together with pieces of the carapace)
Traded as:	Whole shell with sun-dried skin still attached, disarticulated pieces of shell, shell ground into a powder form, or prepared medicines.
Pharmaceutical name:	Carapax Trionycis
Chinese name:	鱉甲
Pinyin name:	Bie Jia
Other common trade names:	Bie Jia Chao (toasted or fried shell pieces), Carapax Amidae; Carapax trionychis, turtle shell, tortoise shell.
Live animal:	
Part traded:	

Species:	**Golden Coin Turtle (*Cuora trifasciata*). It is possible that additional species are also being traded under this name, such as *Cuora amboinensis* and *Mauremys mutica*.**
Part most commonly traded:	Plastron (boiled or powdered)
Traded as:	Chinese medicinal dessert “guilinggao”
Pharmaceutical name:	Plastrum Testudinis
Chinese name:	龟苓膏
Pinyin name:	Gui Ban
Other common trade names:	Plastron Testudines, testudinis shell, tortoise plastron, Bie Jia Jiao (Turtle Carapace Glue), Gui Jia (when carapace and plastron are combined).
Live animal:	
Part traded:	

Figures 91 - 94 illustrate how packaged medicinals can take many forms, including but not limited to plasters, pills, capsules, powders, liquids, and medicine balls. Examination of characters and images on the packaging labels can help provide initial recognition of products that may contain material sourced from tortoises or freshwater turtles, which can then be followed up with additional examination and investigation as appropriate.

Figure 91 Turtle jelly “guilinggao” (龟苓膏) is traditionally made using the shells of *Cuora trifasciata*, as appears on this label.

Figure 92 Rheumatism medicine labeled to contain turtle (Testudines) shell.

Figure 93 Medicine labeled to contain turtle (Testudines) shell.

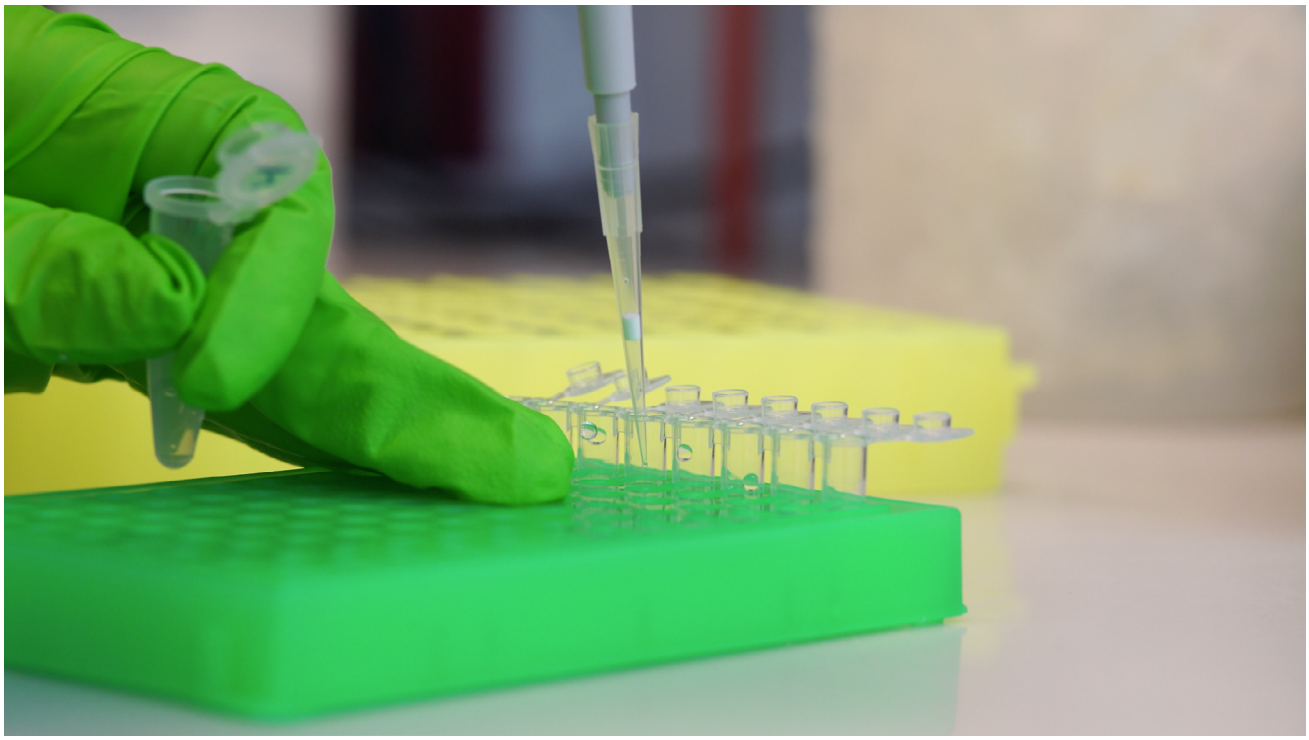
Figure 94 “Golden Coin Turtle” (*Cuora* spp.) pills.

CHAPTER 2.8: SCIENTIFIC & MUSEUM SPECIMENS

Scientific and museum specimens containing material from tortoises and freshwater turtles are also traded and must be checked to make sure they are transported with the required permits and documentation. This includes specimens such as blood and tissue samples, bones, skeletons, and taxidermy, and others. Although the movements of these specimens may sometimes be governed by different national regulations than those for commercially traded items, they must still be treated as CITES-listed specimens when shipped internationally. For more information about what materials are defined as CITES-listed specimens, please refer to Article I of the Convention and to learn more about the requirements for the trade in CITES-listed specimens by registered scientific institutions, please refer to CITES Resolution Conf. 11.15 (Rev. CoP18): *Non-commercial loan, donation or exchange of museum, herbarium, diagnostic and forensic research specimens.*

CHAPTER 3: ADDITIONAL IDENTIFICATION RESOURCES

Accurate species identification is fundamental to effectively monitor and regulate the trade in tortoises and freshwater turtles. This information is essential for law enforcement authorities to determine whether or not trade was lawfully conducted and to take appropriate regulatory enforcement action. Tortoise and freshwater turtle parts, products and derivatives often lack some of the characteristics normally used to identify species by physical appearances. Depending on the size, quantity, and condition of the material available for inspection, there are identification guides, tortoise and turtle specialists, and forensic laboratories that can help to confirm and identify the presence of tortoise or freshwater turtle material and help to identify it to species. The following sections provide additional support for responding to the suspected presence of traded tortoise or freshwater turtle material.



CHAPTER 3.1: EXPERT CONSULTATION

Subject matter experts may be able to provide assistance in the identification of tortoise and freshwater turtle material based on photographs and other details describing the shipments in question. When taking photographs, please refer to the Guidance To Photographing Live Tortoises and Freshwater Turtles for Identification. Tortoise and turtle experts can be found based at universities, zoos, rescue centers or other institutions. Many of these experts are members of the International Union for Conservation of Nature Species Survival Commission (IUCN-SSC) Tortoise and Freshwater Turtle Specialist Group and can be reached by submitting a request for help through this contact form at their website.

A tortoise and freshwater turtle rapid-response identification network also exists under the auspices of the IUCN-SSC Tortoise and Freshwater Turtle Specialist Group. The purpose of this rapid-response identification network is to, at short notice, assist authorities responsible for wildlife law enforcement with the identification of tortoise or freshwater turtle specimens seized or confiscated, using photographs of the seized or confiscated specimens as the basis for identification. The services of experts included in the rapid-response identification network are provided on a confidential basis and free of charge, and are available to authorities responsible for wildlife law enforcement only. Detailed information about the network and how to access its services, have been made available in the digital library of the Closed User Group for the CITES Tortoise and Freshwater Turtles Task Force, established on the World Customs Organization (WCO) CENComm platform. For further information, consult CITES Notification to the Parties No. 2018/085 dated 2 November 2018.

CHAPTER 3.2: LABORATORY ANALYSIS

In some cases, forensic assistance may be required, such as DNA analysis, to identify whether or not tortoise or freshwater turtle material is present and from which species the material originated.

In this chapter a list of laboratories with wildlife forensic capabilities that may accept tortoise or turtle samples on a case by case basis is provided. All of these laboratories are also present in the "Directory of laboratories conducting wildlife forensic testing" available at the CITES webpage on Wildlife Forensics, where additional helpful tools and resources can be found. This directory may occassionally be updated with additional laboratories, and should be consulted from time to time to check for new information.

The list of laboratories below is not exhaustive, and others may be available in your respective region. This list is current as of February 2021.

Australia, Oceania

Australian Centre for Wildlife Genomics, Sydney

Greta Frankham
Wildlife.Forensics@australian.museum
https://australian.museum/get-involved/amri/acwg/

Switzerland, Europe

Institute of Forensic Medicine, Zurich

Nadja Morf
Nadja.Morf@irm.uzh.ch
https://www.uzh.ch/cmsssl/irm/en/dienstleistung/dna.html

The Netherlands, Europe

Netherlands Forensic Institute, the Hague

Irene Kuiper
i.kuiper@nfi.minvenj.nl
General contact
NHBS@nfi.nl
http://www.forensischinstituut.nl/

United Kingdom, Europe

Science and Advice for Scottish Agriculture, Edinburgh

Lucy Webster
wildlifeforensics@sasa.gov.scot
http://www.sasa.gov.uk/wildlife-environment/wildlife-crime

United States of America, North America

US Fish and Wildlife Service, National Foresnic Laboratory, Ashland

Ed Espinoza
ed_espinoza@fws.gov
https://www.fws.gov/lab/

CHAPTER 3.3: ADDITIONAL PUBLISHED RESOURCES

Many guides are available to help identify tortoises and freshwater turtles to species when live or primarily whole specimens are available for examination. A list of these resources can be found in CITES CoP17 Doc.73 Annex 4, and many of these publications were also used in the preparation of this guide. Below is a list of additional publications that can help identify parts, products and derivatives of tortoises and freshwater turtles.

Yudha, D., Aritona, F. and R. Eprilurahman. 2020. *Characteristics of Shell Bone as an Identification Tool for Turtle Species (Reptiles: Testudines) in Java, Borneo, and Sumatra.* Journal of Tropical Biodiversity and Biotechnology, 5(1), 35-43. doi: https://doi.org/10.22146/jtbb.47227

UNEP-WCMC (Comps.) 2020. Checklist of CITES species – CITES Identification Manual. CITES Secretariat, Geneva, Switzerland, and UNEP WCMC, Cambridge, United Kingdom. https://cites.org/sites/default/files/eng/prog/id_material/Identification_materials_Volume5_EN.pdf

Switzerland. 2015. Federal Food and Safety and Veterinary Office, Tengwood Organisation. *Bushmeat: Information and identification guide.* A collaboration of the Federal Food Safety and Veterinary Office and Tengwood Organisation. [Bern, Switzerland: FSVO, 2015. Available in English and French: https://cites.unia.es/cites/file.php/1/files/bushmeat-FSVO.pdf

Tallant, J., Brook, S., Roberton, S., and T.X. Viet . 2010. *An Identification Guide to Commonly Traded Wildlife Products in Southeast Asia.* 2nd Edition. Wildlife Conservation Society, Hanoi, Vietnam. https://library.wcs.org/DesktopModules/Bring2mind/DMX/Download.aspx?EntryId=31923&PortalId=80&DownloadMethod=attachment&test=1

Pendry, S., C. Allen, J. Wu and G. Cameron. 2004. *Traditional Asian medicine identification guide for law enforcers: version II).* Her Majesty's Customs and Excise, London and TRAFFIC International, Cambridge, UK. A guide to assist enforcers to determine which medicines and ingredients are legal or illegal. 322pp. https://www.traffic.org/site/assets/files/9751/asian-medicine-identification-guide-for-law-enforcers.pdf

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