A Guide to the Identification of Seahorses

Sara A. Lourie, Sarah J. Foster, Ernest W. T. Cooper, and Amanda C. J. Vincent

TRAFFIC
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ADVANCING MARINE CONSERVATION

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Cover photo of *Hippocampus ingens* by Wolcott Henry.

Back cover photo of dried seahorses for sale as traditional Chinese medicine. Right tray holds bleached *H. barbouri*. Left tray holds a mix of *H. comes, H. spinosissimus, H. trimaculatus* and *H. ingens*. Photo by Ernest W. T. Cooper, TRAFFIC North America.

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1.0 INTRODUCTION

The 12th meeting of the Conference of Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) took place in Santiago, Chile, from November 3 to November 15, 2002. During this meeting the Parties (signatories to CITES) voted to include all seahorses (genus *Hippocampus*) in Appendix II of the Convention, effective May 15, 2004[1].

Effective implementation of the CITES listing will require that government authorities and other stakeholders be able to identify seahorse species that are utilized in international trade. This guide has been developed to help meet this need.

The goal of the guide is to provide technically accurate information that is useful to specialists and non-specialists alike. This is no simple task as many species are similar in appearance and their identification can be challenging.

The trade in seahorses involves both live and dead specimens. In some regions the live trade is the dominant pressure on seahorse populations, but the great majority of the seahorses in international trade are dried and destined for use in traditional medicine (see Section 3.0). This guide therefore has been designed with a bias towards the identification of dead specimens.

2.0 METHODS

The species descriptions provided here are based on a 1999 publication by Lourie *et al* entitled *Seahorses: An Identification Guide to the World's Species and their Conservation*[2]. Materials from this earlier publication have been revised and reformatted and new content has been added to produce this guide.Lourie *et al*[2] describe 32 species of *Hippocampus*. Recent work, notably by Horne[3] and Kuiter[4, 5, 6], has led to the description of other seahorse species. Further morphometric and genetic research is likely to prove at least some of these species designations valid, and there is every indication that seahorse taxonomy will continue to evolve and that new species will be described. The practicalities of management and enforcement of the CITES listing, however, necessitate that the seahorse taxonomy be held to a clearly defined list. The taxonomy used in this guide is therefore based on the 1999 Project Seahorse listing, with the addition of *H. denise*. This guide is limited to these 33 species.

The original maps in Lourie *et al* showed only confirmed location data[2]. These maps have been modified to show the approximate ranges for each species based on both the confirmed and suspected distribution. The countries of occurrence in the species descriptions have similarly been separated according to whether the occurrence is confirmed or suspected.

Twenty-five of the line drawings of seahorse species used in Lourie *et al*[2], have been reprinted in this publication. The original drawings of *H. angustus* and *H. erectus* have been replaced and those of *H. abdominalis*, *H. barbouri*, *H. comes* and *H. zebra* have been revised; new drawings of a male *H. camelopardalis* and a female *H. zebra* have been added. Colour illustrations of the 33 species have been added. All drawings and revisions were made from preserved specimens or from photographs supplied by Project Seahorse.

Section 4.0 and Appendices A and B were developed from the information provided by Lourie *et al*[2] and Lourie and Randall, 2003[8], and through examination of dried specimens. Tables 2–5 show the range of values for each characteristic. The values highlighted in black represent the modal (most common) values for counts such as the number of tail rings, and the average value for measurements such as the ratio of head length to snout length (HL/SnL).

The biological information included in Section 5.0 has been updated from Lourie *et al*[2], based on an extensive literature search and on contributions from members of the networks of syngnathid researchers and aquarium professionals, co-ordinated by Project Seahorse.

The photographs in Appendix C are of specimens in the collections of the Redpath Museum of McGill University (Montreal), the Vancouver Aquarium Marine Science Centre (Vancouver), and TRAFFIC North America – Canada (Vancouver).

The spelling of country names is based on the list of member states of the United Nations[9].

Throughout the text the abbreviation of *H.* is used in place of the genus name *Hippocampus*.

3.0 SEAHORSE CONSERVATION AND BIOLOGY

3.1 Conservation

Much of the information presented here on trade and conservation is based on the trade report that first raised awareness of large scale trade in seahorses: *The International Trade in Seahorses*[10]. Additional supporting references are given in endnotes.

A clear understanding of species identification is important to the effort to advance international seahorse conservation and management. Effective implementation of the CITES listing of seahorses will depend on the ability of the CITES signatory nations (the Parties) to ensure that trade is not detrimental to wild populations of seahorse. The success of this effort will depend heavily on accurate species identification.

Threats to seahorses
Seahorses are threatened by direct exploitation, accidental capture in non-selective fishing gear (bycatch), and degradation of their habitats. Some of the world's poorest fishers make their living specifically targeting seahorses. Bycatch from trawlers, however, appears to be the largest source of seahorses in international trade, and the trawl gear also damages their coastal habitats[11]. More research needs to be done to assess loss of seahorse habitat, especially seagrasses, and its impact on wild populations.

Seahorses are sold dried for traditional medicines, tonic foods and curiosities, and live for ornamental display. Traditional medicines (TM), particularly traditional Chinese medicine (TCM) and its derivatives, account for the largest consumption of seahorses. Large, pale and smooth seahorses are believed by some to have a higher medicinal value in TCM[10]. Pre-packaged pharmaceuticals are also popular in TM, and offer industry a chance to absorb animals previously thought undesirable for use in conventional (whole) form, including juvenile seahorses[10, 12].

The available evidence showed that in 1995 at least 32 countries traded syngnathids (seahorses and their immediate relatives), and that trade in Asia alone exceeded 45 tonnes of dried seahorses[10]. Further research showed that nearly 80 countries had traded syngnathids by 2000, with many new sources in Africa and Latin America[11]. Moreover, the few official data, trade surveys, and qualitative evidence all indicated that the Asian trade in dried seahorses exceeded 50 tonnes in 2000. Hundreds of thousands of live seahorses were traded internationally in both 1995 and 2000, with small specimens finding a ready market[11].

Conservation impacts
The impacts on seahorse populations of this trade are considerable, especially when combined with the damage that is being inflicted on their vulnerable inshore marine habitats. It is impossible to determine exactly how many seahorses live in the wild and it is difficult to assess how individual species are coping with the exploitation that is taking place, but a combination of customs records, quantitative research and qualitative information indicates that seahorse catches and/or trades have declined markedly. This reflects a loss of population rather than a drawdown of the trade: estimated population declines of between 15 and 50 percent over five-year periods are common[11]. The 2003 World Conservation Union (IUCN) Red List now recognises one seahorse species as Endangered, nine as Vulnerable, and all other species as Data Deficient (denoting the need for more research)[13].

Many countries additionally have established their own domestic conservation assessments or have drawn up regulations that recognise the threat to seahorse populations.

Seahorses and CITES

As of February 2004, CITES included 164 Parties[14]. The main aim of the Convention is to ensure that cross-border trade in wild animals and plants does not threaten survival of the population or species. Species may be brought under CITES management if they are, or may become, threatened by international trade. The species covered by CITES are listed in three Appendices, according to the degree of protection they need. These Appendices are updated at the meeting of the Conference of the Parties, held approximately every two years, and are legally binding to member states that have signed the treaty. CITES is directly concerned only with threats that arise through trade in a species, and only if such trades are international.

In November 2002 the CITES Conference of the Parties decided to add all known species of seahorses to Appendix II[1], effective May 2004. The 18-month deferral of the listing was intended to give governments time to develop implementation strategies that respect the needs of fishers and traders. The effective management of the trade in both dried and live animals demands that information gathering be improved to provide accurate, long-term data for analysis.

Species listed in CITES Appendix II are those for which the wild populations are threatened, or might become threatened, by international trade. Listing in Appendix II is intended to ensure that future use of the species is undertaken in a sustainable manner. Trade is allowed, but exporting Parties are required to ensure that their exports do not damage and are not detrimental to wild populations of the species. Such “non-detriment findings” are central to the function of the Convention. CITES export and/or re-export permits are mandatory for trade, with some countries imposing further domestic regulations.

An Appendix II listing puts the onus on the exporting Party to determine what level of trade is sustainable. The Party must accordingly obtain the necessary biological, fisheries and trade information to permit an accurate sustainability assessment. The emphasis that the listing places on the delivery of non-detriment findings means that species identification is critical.

Importance of this listing

Seahorses are among the first marine fish species of commercial importance to be listed on the Convention, with basking and whale sharks. These fishes will also be among the largest wildlife trade issues under CITES, in terms of number of animals traded per annum. Implementation of the seahorse listing will be a challenge to CITES, but one that must be met if pressures on seahorse populations are to be reduced.

The CITES listing provides an important means of improving monitoring and management procedures for seahorse populations affected by international trade. Those nations affected by the listing must assess the population status of their seahorses and, if necessary, adjust seahorse takes in both their targeted and non-selective fisheries. In order to secure the future for these populations (and their trade), nations will also need to restore seagrass, coral, mangrove and estuarine habitats to their full ecological function. Parties striving to adjust exploitation of seahorse populations to sustainable levels will need to employ a broad array of management options in order to meet the needs of wild populations and dependent fishing communities alike.

3.2 Biology

The following section is drawn from a new review of the biology and ecology of seahorses (Foster and Vincent, in press)[15]. Primary references to all statements can be found therein.

Taxonomy
Seahorses are grouped with pipefishes, pipehorses and seadragons as members of the family Syngnathidae[16]. They are of the same order (Gasterosteiformes) as cornetfishes, pegasids (sea moths), snipefishes, sticklebacks and trumpetfishes[17, 18]. Pipefishes look like seahorses that have been straightened and stretched until they are long and narrow. The tail is not prehensile. In general, the pipehorse's head is angled slightly towards its trunk, and it has an elongated body with a grasping or coiling tail. Seadragons have deep, laterally flattened bodies, and have elaborate, permanent leaf-like appendages that camouflage them among floating seaweed. Only 33 species of seahorse (genus *Hippocampus*) are recognised in this guide, but it is likely that more species will emerge from further taxonomic research. Most seahorse species have not been studied in the wild.

Distribution and movement
Seahorses occupy both temperate and tropical coastal waters, with a distribution from about 50 degrees north to 50 degrees south. They may usually be found among corals, macro algae, mangrove roots and seagrasses, but some live on open sandy or muddy bottoms. Certain species may be found in estuaries or lagoons. Seahorses tend to be patchily distributed at low densities. They are particularly susceptible to habitat degradation from human activities. Most seahorse species studied exhibit high site-fidelity and small home range sizes, at least during the breeding season.

The young of some species are planktonic, entering the water column immediately after birth. The extent of juvenile dispersal by passive means is unknown, but may provide some gene flow among populations.

Survival
The lifespans of seahorses are estimated, generally from laboratory observation, to range from about one year in the very small species to about three to five years in the larger species. Mortality rates for all life history stages are generally unknown. Predation is probably greatest in juveniles, which are eaten by many fish and invertebrates. Adult seahorses are presumed to have few predators as a result of excellent camouflage and their unappetizing bony plates and spines. Seahorses have been found in the stomachs of large pelagic fishes such as tuna and dorado and are eaten by skates and rays[19, 20, 21], penguins, and other water birds[4].

Reproduction
The female seahorse produces the eggs and the male the sperm, and then the male seahorse becomes pregnant. Sexual maturity in males can be recognised by the presence of a fully developed brood pouch, except in the pygmy seahorses *H. bargibanti* and *H. denise*, which lack externally obvious pouches[8]. Seahorses mature at about four months to one year, depending on the species. The height at first maturity similarly varies by species.

The breeding season differs with the location of the population, and appears to be influenced by environmental parameters such as light, temperature and monsoon season. The breeding season generally lasts longer in tropical than in temperate waters, although at least one temperate species breeds year round.

All species of seahorses studied in the wild appear to be monogamous within a single breeding cycle, the male accepting eggs from only one female. Many species also form pair bonds that last at least throughout the breeding season, although some have shown variation in mating patterns, switching partners between cycles. Pair bonds in monogamous species are commonly reinforced by daily greetings that extend into courtships once the male gives birth.

The female deposits eggs into the male's brood pouch, where he fertilises them, protects them, nourishes them, and regulates their environment. Pregnancy lasts about nine to 30 days, depending on the species, the length increasing with latitude and decreasing water temperature. Males of all species studied go through more than one pregnancy in a breeding season.

Males release about 100 – 300 young per pregnancy, but brood size can range from as few as five, for the small species *H. zosterae*[22], to approximately 2000 young by one *H. ingens* male[23]. Brood size increases with male height across species. Small brood size may be somewhat offset by the presumed greater survival of the well developed young at release from the pouch. Young seahorses look like miniature adult seahorses, are fully independent after birth, and receive no further parental care. Newborn seahorses range on average from 2 –12 mm in length.

Conservation consequences

Seahorse natural history and population dynamics may make the animal particularly susceptible to over-fishing, for the following reasons:

- Production of few young per breeding cycle limits the potential reproductive rate, although this may be offset by advanced development of the young when they leave the pouch
- Male pregnancy means that young seahorses depend on parental survival for far longer than is the case among most fish
- Monogamy in most species studied means that widowed animals stop reproducing until they find a new partner
- Low population density means that lost partners are not quickly replaced
- Monitoring of known individuals suggests that natural rates of adult mortality may be low, making fishing a new pressure
- Low adult mobility and small home ranges in many species may restrict the recolonisation of depleted areas, although juveniles may be the primary dispersers

Seahorse research has made great advances, but much more needs to be learned about key life history parameters such as natural mortality, growth rates and juvenile dispersal.

4.0 SEAHORSE MORPHOLOGY AND IDENTIFICATION

4.1 Morphology

Seahorses have heads positioned at right angles to their bodies, curved trunks, and a grasping, finless tail. Their skin is stretched over a series of bony plates that are visible as rings around the trunk and tail. Some species also have bony bumps or skin filaments protruding from these bony rings[2]. The plates are jointed on the tail, but are interlaced to form a complete outer skeleton on the trunk[24].

Seahorses may change colour and grow skin filaments over time to blend in with their surroundings. Short-term colour changes may also occur during courtship and other intra-species interactions[15].

Adult seahorse heights (Figure 1) vary among species and range from less than 2 cm (*H. denise*)[8] to 35 cm (*H. abdominalis)*[25]. Seahorse weights vary with reproductive stage, increasing considerably for females that are carrying eggs and for males that are pregnant. Some species are sexually dimorphic in length, with males longer than females, and many are sexually dimorphic in proportions, with males having longer tails and females longer trunks[15].

The body proportions of a seahorse change over a lifetime. Compared to adults of the same species, juveniles have larger heads relative to their bodies, are slimmer and spinier in form, and have relatively higher coronets[2]. These differences must be considered when identifying juvenile specimens. The fin ray and tail ring counts are believed to be constant through life, however, and therefore may be the most reliable characters by which to identify juvenile specimens[2].

4.2 Identification

The ease by which a seahorse specimen may be identified varies from species to species. Very few species (e.g., *H. bargibanti* and *H. minotaur*) are morphologically distinctive enough from other species to be immediately identifiable, but many species, such as *H. abdominalis* and *H. trimaculatus*, have distinguishing characteristics that allow them to be readily identified. Others, including *H. kelloggi* and *H. kuda*, can be difficult to identify due to their variable or less distinctive characters and morphological similarity to one another (see also Appendix D). Some of these problematic species are also common in trade.

It may be tempting to identify a seahorse simply by comparing a specimen to the drawings, descriptions and photographs in Section 5.0 and Appendix C of this guide. This approach may be effective for a few distinctive species, or for an investigator who is experienced with seahorse identification. In most cases, however, species are so similar that this will often result in an incorrect identification. Seahorse identification is a matter of eliminating possible species until the characters on a specimen are found to match only one species. It is recommended that an investigator follow the procedure outlined in Steps A, B, C and D below as an aid to identification. Once this procedure is completed it is important finally to compare all of the characters of the specimen to the description of the suspected species, to ensure that the identification is correct.

Identifying live specimens
The identification of live specimens presents special problems. The handling of live seahorses should be avoided, given the likelihood that it will result in injury to or death of the specimen, but the

plastic bags in which these animals typically are transported often obscure close examination. One possible solution is to carefully transfer the contents of the bag into a clear glass or hard plastic container for easier observation. Alternatively, specimens in trade may be allowed to reach their final destination, where they can be observed and identified once they have been released into an aquarium.

Box 1. Important Morphological Terms

Cheek spines (CS)	Spines at the bottom of the operculum on each side of the animal's head
Cleithral ring	Bony ring immediately behind the operculum
Coronet	Enlarged structure found on the top of the head of some species
Dorsal fin rays	Bones that support the dorsal fin
Eye spines (ES)	Spines directly above the eye
Head length (HL)	Distance from the mid-point of the cleithral ring to the tip of the snout. The mid-point of the cleithral ring is visible as the point where the ring intersects with a ridge running from the dorsal spine on the first trunk ring
Height (Ht)	Distance between the tip of the coronet to the tip of the uncurled tail
Keel	Sharp median ridge running down the ventral side of the trunk in some species
Nose spine	Single spine located in front of the eyes on the upper side of the snout in some species
Operculum	Bony flap that covers the gill slits
Pectoral fin rays	Bones that support the pectoral fin
Snout length (SnL)	Distance between the bump immediately in front of the eye (not the nose spine) to the tip of the snout
Tail length	Distance between the lateral mid-point of the last trunk ring to the tip of the uncurled tail
Tail rings (TaR)	Raised bony ridges that encircle the tail of the seahorse
Trunk length	Distance from the mid-point of the cleithral ring to the lateral mid-point of the last trunk ring
Trunk rings (TrR)	Raised bony ridges that encircle the body of the seahorse
Tubercles	Raised rounded nodules located at the intersections of rings and ridges (some species only)

Source: Lourie *et al*[2]

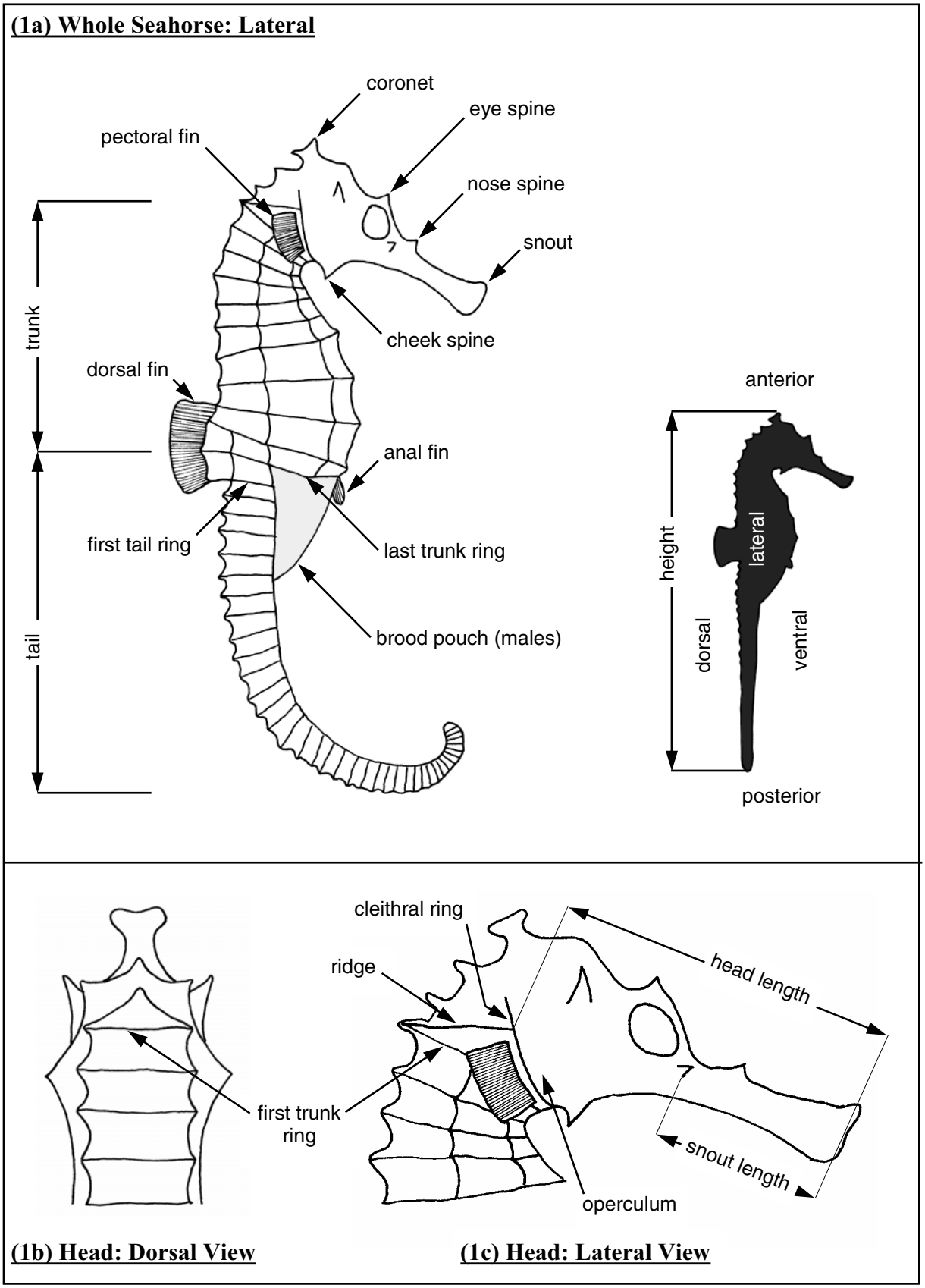


Figure 1. External Morphology of a Seahorse

Step A: Preparation

Equipment and supplies
The following equipment and supplies will be useful when identifying a seahorse specimen:

- Ruler and/or callipers
- Magnifying glass or loupe
- String, ribbon or flexible wire (minimum length 40 cm)
- Forceps
- Calculator
- Dissecting microscope (optional, but can be valuable)
- Pencil and a photocopy of the seahorse identification data sheet provided in Appendix A of this guide. Blank paper can also be used to record data about the specimen; however, identification will be easier to accomplish using the checklist

Characters used
An examination of the following characters (see Figure 1) is used in Steps B and C to assist in identifying a seahorse specimen:

- Length of the snout in relation to the length of the head (HL/SnL)
- Numbers of tail and trunk rings
- Height of the specimen
- Numbers of cheek and eye spines
- Numbers of trunk and tail rings that support the dorsal fin
- Numbers of dorsal and pectoral fin rays

Note: The characters used to identify seahorses tend to vary among and within species (see Tables 1–6). It is possible that a specimen will exhibit characters that do not precisely fit the description for any species, and it may therefore be necessary to make an identification based on the closest match to a species description, rather than a perfect match.

Step B: Record Data about the Unidentified Specimen

B1. Using a ruler and a piece of string, wire, or ribbon, measure and record the height (Ht) of the specimen (see Figure 1a).

Note: The maximum height can be useful for identification, especially for larger specimens, by eliminating some species as possibilities. For example, an unidentified seahorse specimen measuring 20 cm could not be *H. mohnikei*, which has a maximum adult height of 8 cm (see Table 1). It should be remembered that most specimens will be smaller than the maximum size for a species, however.

B2. Measure and record the head length (HL) and snout length (SnL) of the specimen.

B3. Calculate and record the HL/SnL ratio for the specimen.

B4. Count and record the number of tail rings (TaR) on the specimen.

Notes: A magnifying glass, loupe or dissecting microscope will be required.

Towards the tip of the tail the rings tend to become indistinct and cracks appear between the ridges on the ventral surface. These cracks may be easier to count than the ridges themselves[2].

It is common for inexperienced observers to miss some of the rings at the tip of the tail, resulting in an inaccurate count and often an incorrect identification. If an investigator is not confident that the number of tail rings has been accurately counted, this character should not be used.

B5. Count and record the number of trunk rings (TrR) on the specimen.

Note: The first trunk ring may be identified as the base of the triangle of ridges of the dorsal surface, just behind the head (see Figure 1b). The last trunk ring is the last ring to extend as far as the belly of the animal[2] (it can be identified in Figure 1a as positioned just above the anal fin).

B6. Count and record the number of cheek spines (CS) and eye spines (ES) (both counts will range from 0 to 2) (see Figure 1a).

B7. Count and record the number of tail rings (TaR) and trunk rings (TrR) that support the dorsal fin (see Figure 2).

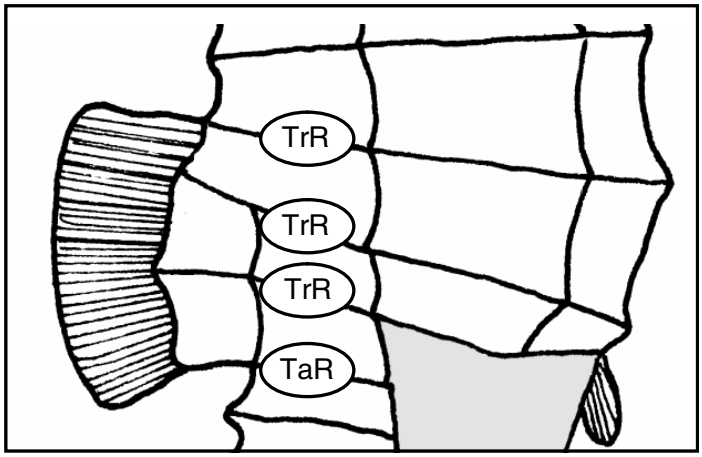


Figure 2. Rings Supporting the Dorsal Fin
TaR = tail ring; TrR = trunk ring
In this example the dorsal fin is supported by 1 tail ring and 3 trunk rings

B8. Count and record the number of dorsal fin rays and pectoral fin rays.
Notes: A magnifying glass, loupe or dissecting microscope will be required.
With dried specimens it may be difficult or even impossible to accurately count the fin rays. An inaccurate count may result in an incorrect identification. If the investigator is not entirely confident that the count of fin rays is accurate, then this step should be omitted.

Step C: Use Tables 1–6 to Determine Possible Species

C1. Compare the height recorded for the unidentified specimen with the information in Table 1. Using a photocopy of the species checklist provided on the seahorse identification data sheet (Appendix A), mark those species that have a maximum height that is equal to or greater than the height of the specimen.

C2. Compare the value for HL/SnL recorded for the unidentified specimen with the information in Table 2. On the species checklist, mark which of the species selected in step C1 could have that value.

C3. Compare the number of tail rings recorded for the unidentified specimen with the information in Table 3. On the species checklist, mark which of the species selected in step C2 could have that number.

C4. Compare the number of dorsal fin rays and pectoral fin rays for the unidentified specimen with the information in Tables 4 and 5. On the species checklist, mark which of the species selected in step C3 could have that number.

C5. Compare the remaining data recorded for the unidentified specimen with the information in Table 6. On the species checklist, mark which of the species selected in Step C4 have characteristics that match the unidentified specimen.

Step D: Identify the Specimen

D1. See Section 5.0. Compare the specimen with the descriptions of those species that are remaining after elimination to step C5.

The following characters should be considered:

- The height and shape of the coronet
- The number, distribution, and size of spines on the body
- Patterns or markings such as stripes or spots

Note: The body colour of seahorses and the presence of skin filaments vary from specimen to specimen and therefore are not characteristics that should be relied upon for a species identification. Some specimens used in traditional Chinese medicine may also be bleached, and as a result will not show any colour or patterns. These specimens usually also appear damaged or incomplete (see Appendix C).

Table 1. Maximum Heights Recorded for Species of *Hippocampus*

(Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)

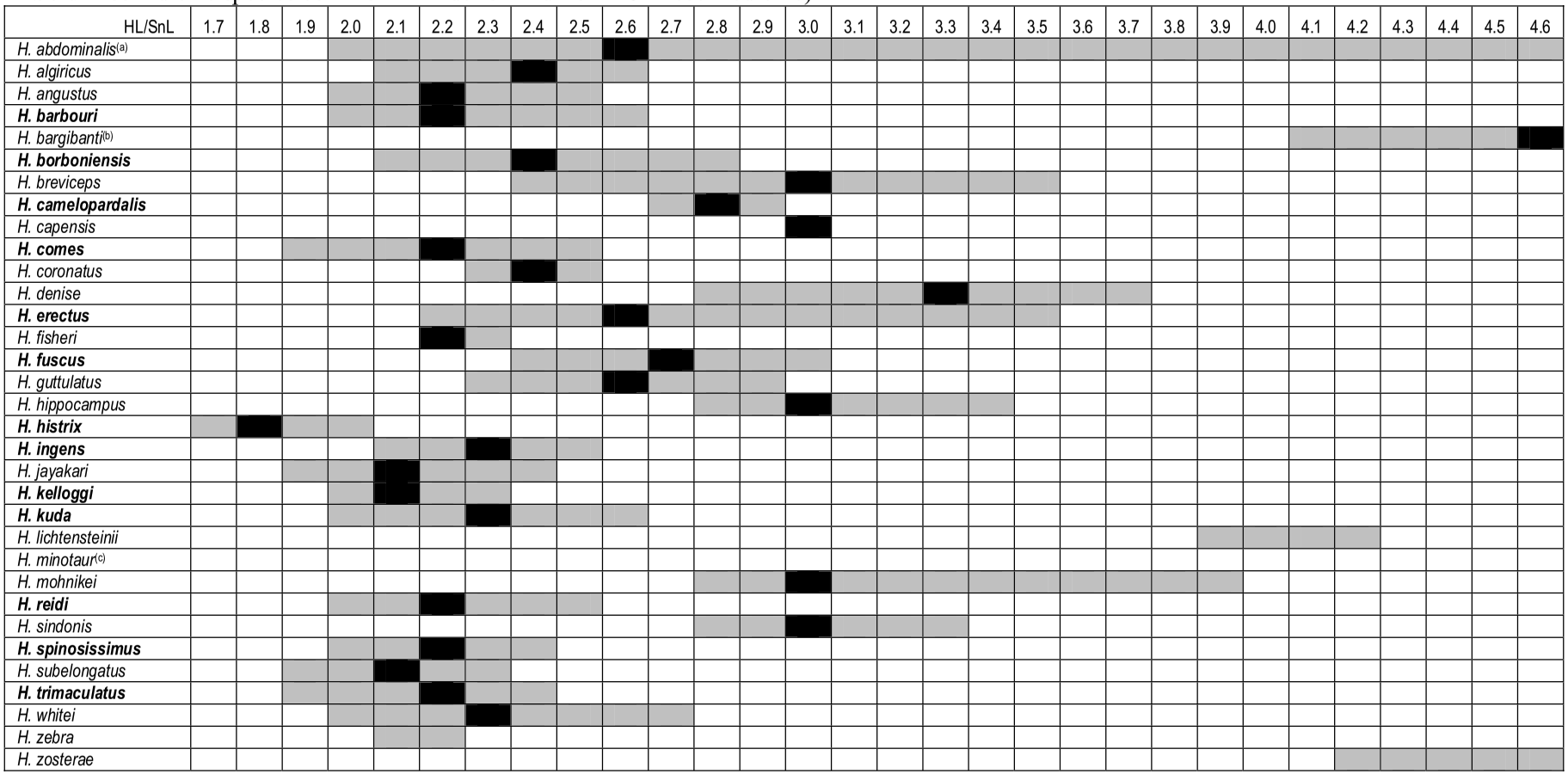
Species	*Maximum height*
H. denise	2.1 cm
H. bargibanti	2.4 cm
H. zosterae	2.5 cm
H. lichtensteinii	4.0 cm
H. minotaur	5.0 cm
H. fisheri	8.0 cm
H. mohnikei	8.0 cm
H. sindonis	8.0 cm
H. zebra	9.4 cm
H. breviceps	10.0 cm
H. camelopardalis	10.0 cm
H. capensis	12.0 cm
H. coronatus	12.7 cm
H. whitei	13.0 cm
H. jayakari	14.0 cm
H. borboniensis	14.0 cm
H. fuscus	14.4 cm
H. barbouri	15.0 cm
H. hippocampus	15.0 cm
H. angustus	16.0 cm
H. histrix	17.0 cm
H. kuda	17.0 cm
H. trimaculatus	17.0 cm
H. spinosissimus	17.2 cm
H. reidi	17.5 cm
H. guttulatus	18.0 cm
H. comes	18.7 cm
H. algiricus	19.0 cm
H. erectus	19.0 cm
H. subelongatus	20.0 cm
H. kelloggi	28.0 cm
H. ingens	31.0 cm
H. abdominalis	35.0 cm

Sources: As noted for individual species in Section 5.0

Note: heights correspond to those recorded in the literature. Exceptional specimens may have heights that exceed these values

Table 2. Ratio of Head Length to Snout Length (HL/SnL) for Species of *Hippocampus*

(Shaded cells indicate the range of HL/SnL values that is possible for each species. Black cells indicate the most common values. Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)



(a) The HL/SnL value for *H. abdominalis* may be as high as 5.1

(b) The HL/SnL value for *H. bargibanti* may be as high as 5.4

(c) The HL/SnL value for *H. minotaur* is greater than 6

Source: Lourie *et al*[2]

Note: Exceptional specimens should have an HL/SnL that falls outside of the given range.

Table 3. Number of Tail Rings per Species of *Hippocampus*

(Shaded cells indicate the range of numbers of tail rings possible for each species. Black cells indicate the most common values. Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)

Number of tail rings	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
H. abdominalis																					
H. algiricus																					
H. angustus																					
H. barbouri																					
H. bargibanti																					
H. borboniensis																					
H. breviceps																					
H. camelopardalis																					
H. capensis																					
H. comes																					
H. coronatus																					
H. denise																					
H. erectus																					
H. fisheri																					
H. fuscus																					
H. guttulatus																					
H. hippocampus																					
H. histrix																					
H. ingens																					
H. jayakari																					
H. kelloggi																					
H. kuda																					
H. lichtensteinii																					
H. minotaur																					
H. mohnikei																					
H. reidi																					
H. sindonis																					
H. spinosissimus																					
H. subelongatus																					
H. trimaculatus																					
H. whitei																					
H. zebra																					
H. zosterae																					

Source: *H. abdominalis* – C Woods [34]; all other species – Lourie *et al*[2]

Note: Exceptional specimens could have a greater or lesser number of tail rings

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Table 4. Number of Dorsal Fin Rays per Species of *Hippocampus*

(Shaded cells indicate the range of numbers of dorsal fin rays possible for each species. Black cells indicate the most common numbers. Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)

Dorsal fin rays	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	25	26	27	28	29	30	31	32	33
H. abdominalis																												
H. algiricus																												
H. angustus																												
H. barbouri																												
H. bargibanti																												
H. borboniensis																												
H. breviceps																												
H. camelopardalis																												
H. capensis																												
H. comes																												
H. coronatus																												
H. denise																												
H. erectus																												
H. fisheri																												
H. fuscus																												
H. guttulatus																												
H. hippocampus																												
H. histrix																												
H. ingens																												
H. jayakari																												
H. kelloggi																												
H. kuda																												
H. lichtensteinii																												
H. minotaur																												
H. mohnikei																												
H. reidi																												
H. sindonis																												
H. spinosissimus																												
H. subelongatus																												
H. trimaculatus																												
H. whitei																												
H. zebra																												
H. zosterae																												

Source: Lourie *et al*[2]

Note: Exceptional specimens could have a greater or lesser number of dorsal fin rays

Table 5. Number of Pectoral Fin Rays per Species of *Hippocampus*

(Shaded cells show the range of numbers of pectoral fin rays possible for each species. Black cells indicate the most common numbers. Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)

Pectoral fin rays	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
H. abdominalis									■	▒	▒					
H. algiricus									▒	■	■					
H. angustus									▒	■	■	▒	▒			
H. barbouri									▒	▒	■	■	▒	▒		
H. bargibanti				■	▒											
H. borboniensis									■	■						
H. breviceps							▒	■	■							
H. camelopardalis											■	■				
H. capensis								▒	■	▒	▒					
H. comes										▒	■	▒	▒			
H. coronatus						■										
H. denise				■	▒											
H. erectus								▒	■	■	▒	▒				
H. fisheri							▒	▒	■	▒						
H. fuscus								▒	■	▒						
H. guttulatus										▒	■	▒				
H. hippocampus							▒	■	▒							
H. histrix											▒	■	▒	▒		
H. ingens									▒	■	▒					
H. jayakari											■	■				
H. kelloggi											▒	■	▒			
H. kuda									▒	■	▒	▒				
H. lichtensteinii					■	■										
H. minotaur					■											
H. mohnikei						▒	■	▒								
H. reidi									▒	■	▒					
H. sindonis						■	■	■								
H. spinosissimus										▒	■	▒	▒			
H. subelongatus										▒	■	▒				
H. trimaculatus										▒	■	■	▒			
H. whitei									▒	■	■	▒				
H. zebra									■	■						
H. zosterae					■	■										

Source: Lourie *et al*[2]

Note: Exceptional specimens could have a greater or lesser number of pectoral fin ray

Table 6. Numbers of Trunk Rings, Rings Supporting the Dorsal Fin, Cheek Spines and Eye Spines per Species of *Hippocampus*

(Scientific names in **bold face** indicate species common in trade for traditional Chinese medicine)

Characters	Trunk rings	Rings supporting dorsal fin		Cheek spines	Eye spines
		Trunk rings	Tail rings		
H. abdominalis	12 or 13	4	1	1	1
H. algiricus	11	2	1	1 or 2	1 or 2
H. angustus	11	2	1	2	1
H. barbouri	11	2	1	2	1
H. bargibanti	11 or 12	3	0	1	1
H. borboniensis	11	2	1	1	1
H. breviceps	11	3	1	1	1
H. camelopardalis	11	2	1	0	1
H. capensis	11	2	1	0	0
H. comes	11	2	1	2	1 or 2
H. coronatus	10	2	0	1	1
H. denise	12	3	0	0	0
H. erectus	11	2	1	1 or 2	1
H. fisheri	11	2 or 3	1 or 2	1	1 or 2
H. fuscus	11	2	1	0	0
H. guttulatus	11	2	1	1	1
H. hippocampus	11	2	1	0 or 1 or 2	0 or 1 or 2
H. histrix	11	2	1	1	1
H. ingens	11	2	1	1	1 or 2
H. jayakari	11	2	1	2	2
H. kelloggi	11	2	1	1	1
H. kuda	11	2	1	1 or 2	0 or 1
H. lichtensteinii	10	2	0	0	0
H. minotaur	8	1	1	0	0
H. mohnikei	11	2	1	2	0
H. reidi	11	2	1	1 or 2	1 or 2
H. sindonis	10	2	1	1	2
H. spinosissimus	11	2	1	1 or 2	1
H. subelongatus	11	2	1	2	1
H. trimaculatus	11	2	1	1	1
H. whitei	11	2	1	1 or 2	1
H. zebra	11	2	1	0	1
H. zosterae	9 or 10	2	0	0	0

Source: Lourie *et al*[2]

Note: Exceptional specimens could have values for these characters that fall outside a given range

5.0 SPECIES DESCRIPTIONS

5.1 Explanation of species pages

Drawings
Detailed drawings with captions highlight the diagnostic characteristics of each species.

- The drawings have been made from preserved or dried specimens. Apparent differences in size or pattern between the sexes reflect the individual characteristics of the specimens depicted and may not represent actual sexual dimorphism (consistent and distinct differences between the sexes).
- Scales differ among drawings, so a scale bar (cm) is provided on each image.
- The view from the back of the female (dorsal) gives an impression of the development of the body spines and coronet.

Common names
Common names are given only when there is certainty that the name refers to the particular species, rather than being simply a translation of the generic term "seahorse". In general it is advisable to avoid common names. The language of the common name is given in brackets, followed by the location of use, where known.

Synonyms
Only primary synonyms (that is, cases where the type specimens are members of the same species) are listed.

Description
(See Box 1 for definitions of morphological terms. "Deep" is measured dorsal to ventral; "wide" is measured lateral to lateral.)
Maximum recorded adult height: Height (see Figure 1) rather than length is used in this guide because it is more easily deduced.
Rings: The number of trunk and tail rings. The numbers in brackets provide the numbers of rings in more than 95 percent of the specimens examined.
HL/SnL: The average number of times the snout length (SnL) fits into the head length (HL). The numbers in brackets provide the HL/SnL ratios in more than 95 percent of the specimens examined.
Rings supporting dorsal fin: The number of trunk and tail rings spanned by the dorsal fin.
Dorsal fin rays: The most common number of rays in the dorsal fin. The numbers in brackets provide the numbers of rays in more than 95 percent of the specimens examined.
Pectoral fin rays: The most common number of rays in the pectoral fin. The numbers in brackets provide the numbers of rays in more than 95 percent of the specimens examined.
Coronet: Description of height and characteristics.
Spines: Description of height and characteristics.
Other distinctive characteristics: This includes the development of cheek and eye spines, the presence of a keel, and/or other characteristics of the species that may be used for identification.
Colour/pattern: This refers to the appearance of the species in life, unless otherwise specified. Dead animals tend to be much more uniformly pale brown. This information should be treated as supplementary to the diagnosis given above because seahorses change colour easily and patterns are not always apparent.

Distribution
The distribution is listed as confirmed if specimens or photographs of that species have been seen by the senior author. The distribution is identified as "suspected" if (a) confirmed sightings occur on either side of the country in question, such that the species could also occur in the intervening country, or (b) there is some question as to the identification, or precise location of origin, of specimens that have been seen. This guide is less conservative in its assessment of seahorse distributions than were Lourie *et al*[2]. Species additional to those identified as present might be found in any country in geographic proximity to the confirmed distribution as outlined in this guide (that is, from the same ocean basin). Confirmed and suspected distributions are both indicated by hatch-marks on the maps.

Habitat
The depth of habitat is indicated in metres. Where it is known, additional information about habitat is also provided.

Life history
Data on the size of seahorses at the onset of sexual maturity are patchy and imprecise. Where studies differ in their results, this guide takes the largest value. The height at first sexual maturity given in the species descriptions is therefore the maximum recorded height at the onset of sexual maturity that is cited in any report on the species.

The breeding season is the months during which pregnant males have been observed in the wild.

Gestation duration is the length of time from the fertilisation of the eggs in the male pouch to birth of the young. Birth refers to the release from the pouch of the young.

Brood size is the number of young released by a male in any one cycle. Brood sizes are for a mixture of wild- and captive-mated males.

Species are considered planktonic immediately after birth only in cases where juveniles have been found in plankton tows.

Trade
Information on the trade-related use of the species.

Conservation status
The conservation status and other information about trade and threats to the species.

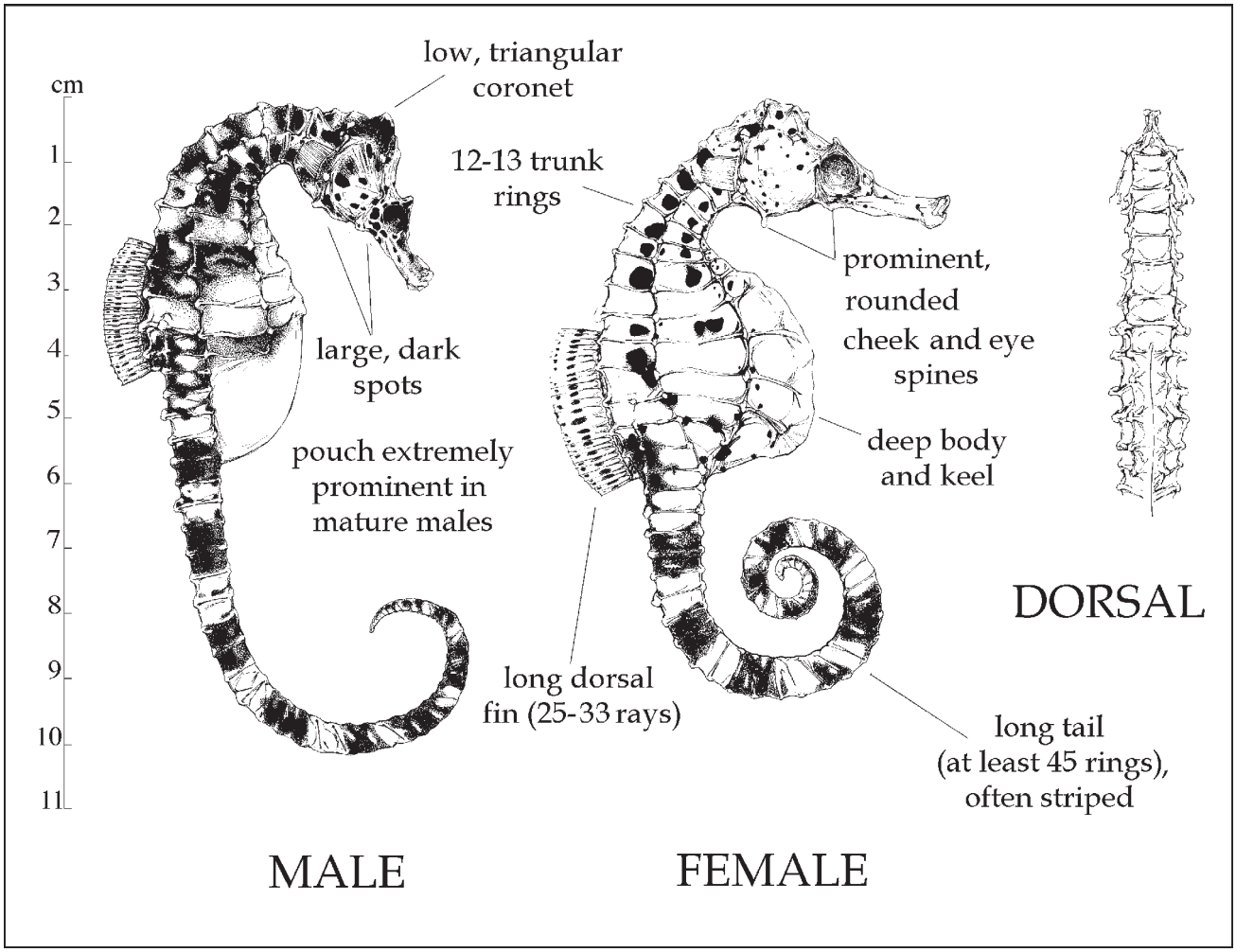
Similar species
The main distinguishing features of species that are similar in appearance.

Other notes
Additional information, such as explanations of taxonomic confusions and genetic data.

Hippocampus abdominalis Lesson 1827

Common names
Big-belly seahorse; pot-bellied seahorse; *manaia* (Maori; New Zealand)

Synonyms
H. agnesæ Fowler 1908; *H. bleekeri* Fowler 1908; *H. graciliformis* McCulloch 1911



Description
Maximum recorded adult height: 35 cm[25]
Trunk rings: 12–13
Tail rings: 47 (45–48)
HL/SnL: 2.6 (2.2–5.0)
Rings supporting dorsal fin: 4 trunk rings and 1 tail ring
Dorsal fin rays: 27–28 (25–33)
Pectoral fin rays: 15 (15–17)
Coronet: Low, triangular wedge
Spines: Low, rounded bumps only
Other distinctive characters: Prominent, rounded eye spines; thick fronds often attached to head region; deep body with keel (especially females); extremely prominent (usually white) brood pouch in mature males

Colour/pattern: Pale, near-white to mottled yellow to variable brown; dark spots and splotches on head and trunk; tail with alternating dark and light bands; mottled dorsal fin. Males have more dark blotches than females and commonly have a yellow slash near the top of the pouch[26]

Confirmed distribution
Australia; New Zealand

Suspected distribution
No other locations suspected

Habitat
Typically found < 50 m depth[4]; maximum reported depth 104 m[27]; among algae, seagrasses and rocky reefs in shallow water[28]; sandy bottom[29]; macro algae stands[30]; attached to sponges and colonial hydroids in deeper water and to jetty piles and other man-made objects[31, 32]; estuaries[33]

Life history
Maximum reported height at onset of sexual maturity 8.7 cm[34]; breeding season year round, peaking in spring to summer[35]; found in groups in wild[33]; sexually polygamous in captivity[30]; egg diameter averages 1.8 mm[15]; gestation duration averages 30 days[15]; length at birth averages 16 mm[15]; brood size usually 300[36]; maximum reported brood size 1116[37]; planktonic immediately after birth[38]

Trade
Dried for curios; live for aquarium or hobbyist use. Not seen in traditional Chinese medicine, but some from New Zealand are sold for traditional Korean medicine (*hanyak*)

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. abdominalis* is listed as Vulnerable by IUCN[13]. Environment Australia lists the conservation status of *H. abdominalis* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 then placed under the Environment Protection and Biodiversity Conservation Act in 2001

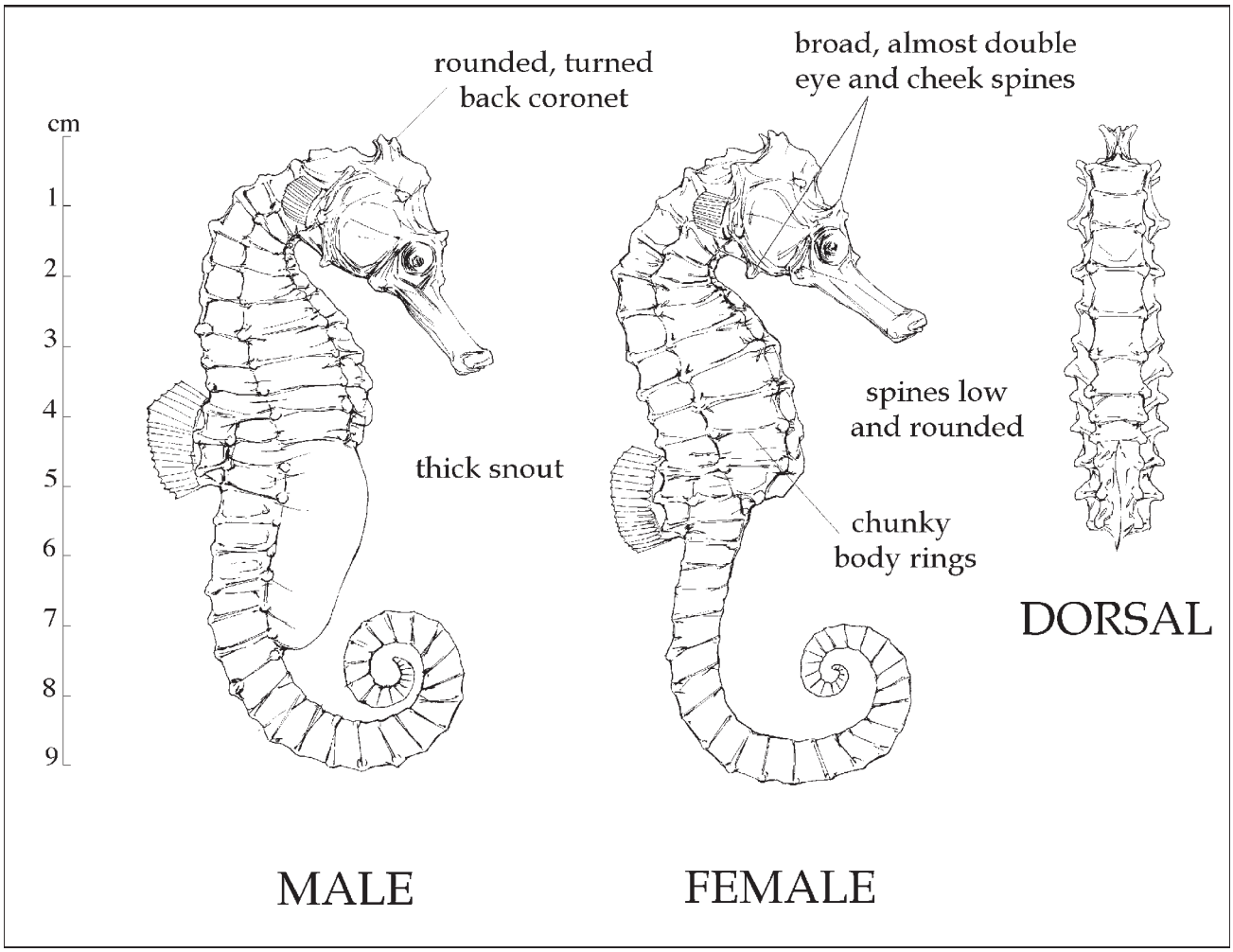
Similar species
- None. *H. abdominalis* is immediately distinguishable from all other seahorses by its deeper trunk (adult only) and larger number of trunk and tail rings and dorsal fin rays

Other notes
- *H. abdominalis* is one of the most sexually dimorphic seahorse species: in comparison to females, males are heavier, have proportionally longer tails; shorter, thicker snouts; and are more heavily marked. Females usually have a deeper keel than males[26]

Hippocampus algiricus Kaup 1856

Common names
West African seahorse

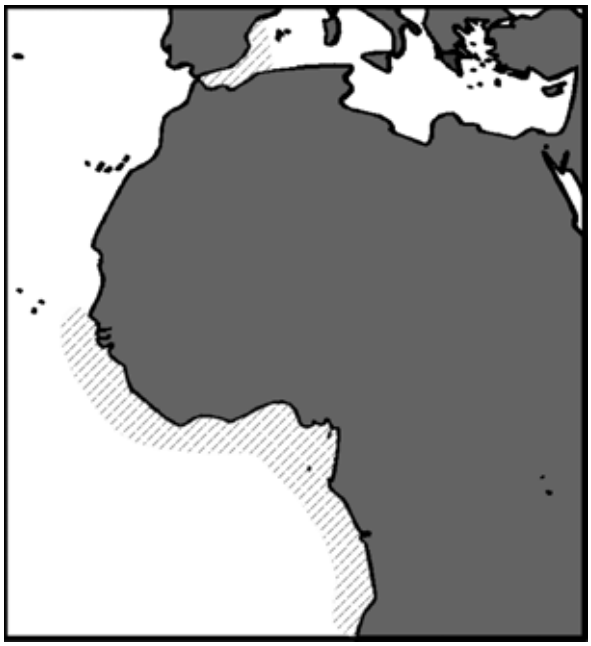
Synonyms
H. punctulatus Kaup 1856; *H. deanei* Duméril 1857; *H. kaupii* Duméril 1870



Description
Maximum recorded adult height: 19 cm[2]
Trunk rings: 11
Tail rings: 36 (35–37)
HL/SnL: 2.4 (2.1–2.6)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17–18
Pectoral fin rays: 16–17 (15–17)
Coronet: Relatively low, rounded and overhanging at the back; flat-topped or with a slight depression
Spines: Low, rounded bumps only
Other distinctive characteristics: Body rings chunky; eye and cheek spines broad or almost double
Colour/pattern: May be covered with tiny white dots and/or larger brown spots

Confirmed distribution
Angola; Benin; Côte D'Ivoire; Gambia; Ghana; Guinea; Liberia; Nigeria; São Tomé and Principe; Senegal; Sierra Leone

Suspected distribution
Algeria; Cameroon; Congo; Democratic Republic of the Congo; Equatorial Guinea; Gabon; Guinea-Bissau; Togo



Habitat
Unknown

Life history
Unknown

Trade
Not yet seen in international trade. This region is, however, believed to be a source of imports, and *H. algiricus* is the only species in the region

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. algiricus* is listed as Data Deficient by IUCN[13]

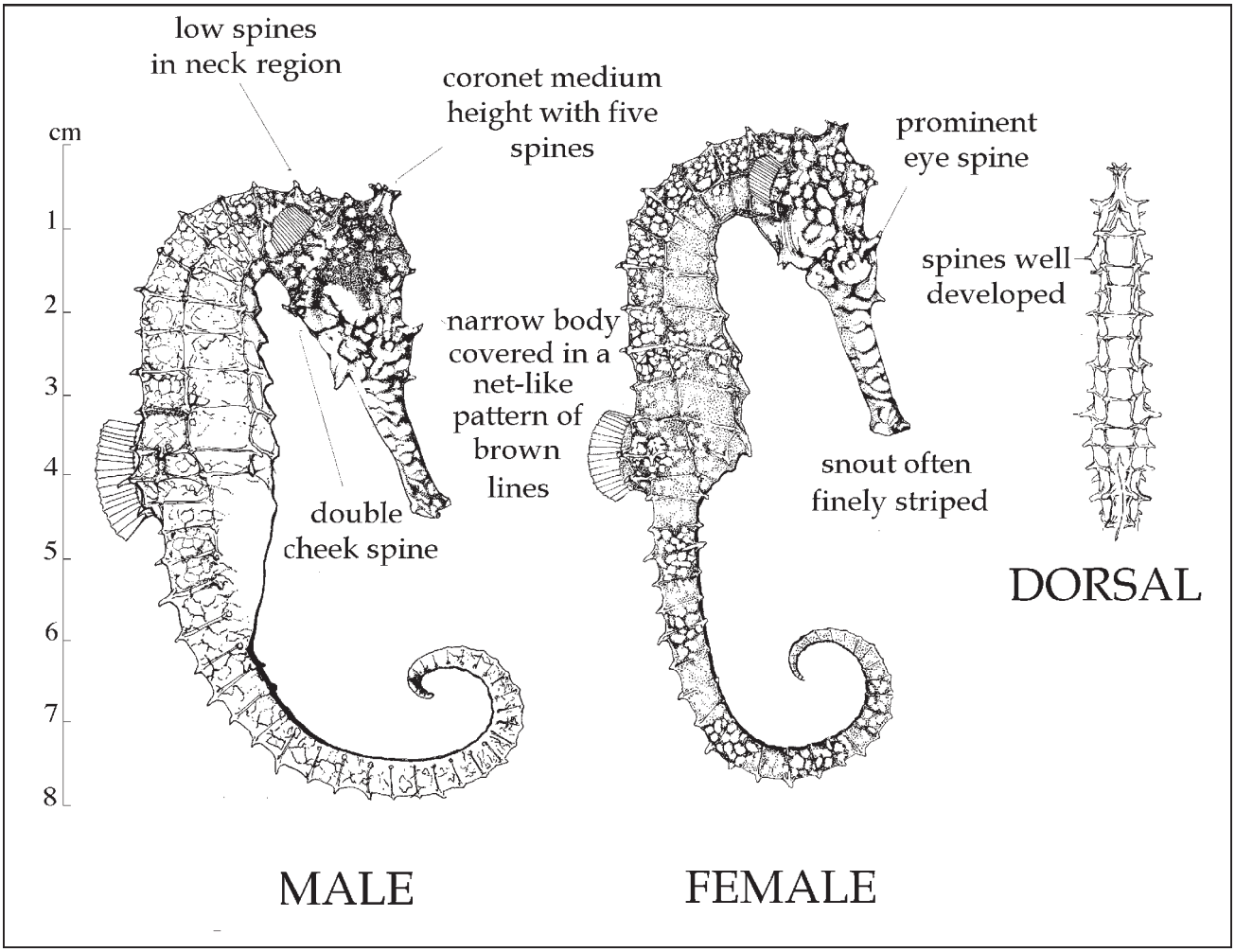
Similar species
- *H. ingens* has more tail rings, a single cheek spine, and usually more dorsal fin rays; it is found only off the west coast of the Americas
- *H. kelloggi* has more tail rings and single eye and cheek spines; it is found only in the Indo-Pacific basin
- *H. kuda* has single eye and cheek spines and is found only in the Indo-Pacific basin
- *H. reidi* has fewer tail rings and a larger coronet; it is found only in the Caribbean

Other notes
- Genetic research suggests that this species is part of the *H. kuda* complex (see Appendix D) and is closely related to both *H. kuda* and *H. reidi*[40]
- Specimens seen from Nigeria and Angola have more developed spines than those from further north and west
- The type specimen apparently comes from Algeria, but no further specimens from the Mediterranean have been seen. Probable distribution is restricted to West Africa

Hippocampus angustus Günther 1870

Common names
Narrow-bellied seahorse

Synonyms
H. erinaceus Günther 1870



Description
Maximum recorded adult height: 16 cm[2]
Trunk rings: 11
Tail rings: 33–34 (32–35)
HL/SnL: 2.2 (2.0–2.5)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18 (17–19)
Pectoral fin rays: 16–17 (15–19)
Coronet: Medium height, with 5 well-developed sharp spines
Spines: Well-developed with blunt or sharp tips; usually low in neck region
Other distinctive characteristics: Double, sharp cheek spines; double spine below eye; prominent, sharp eye spine

Colour/pattern: Body often covered in a net-like pattern of brown markings; snout has fine stripes; spines have a brown band towards their tip

Confirmed distribution
Australia

Suspected distribution
No other locations are suspected

Habitat
Trawled from depths of 3–63 m[2]; algal reef[4]

Life history
Unknown

Trade
Live for aquarium or hobbyist use; however the specimens in trade may actually be misidentified *H. subelongatus*

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. angustus* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. angustus* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998, and placed under the Environment Protection and Biodiversity Conservation Act in 2001

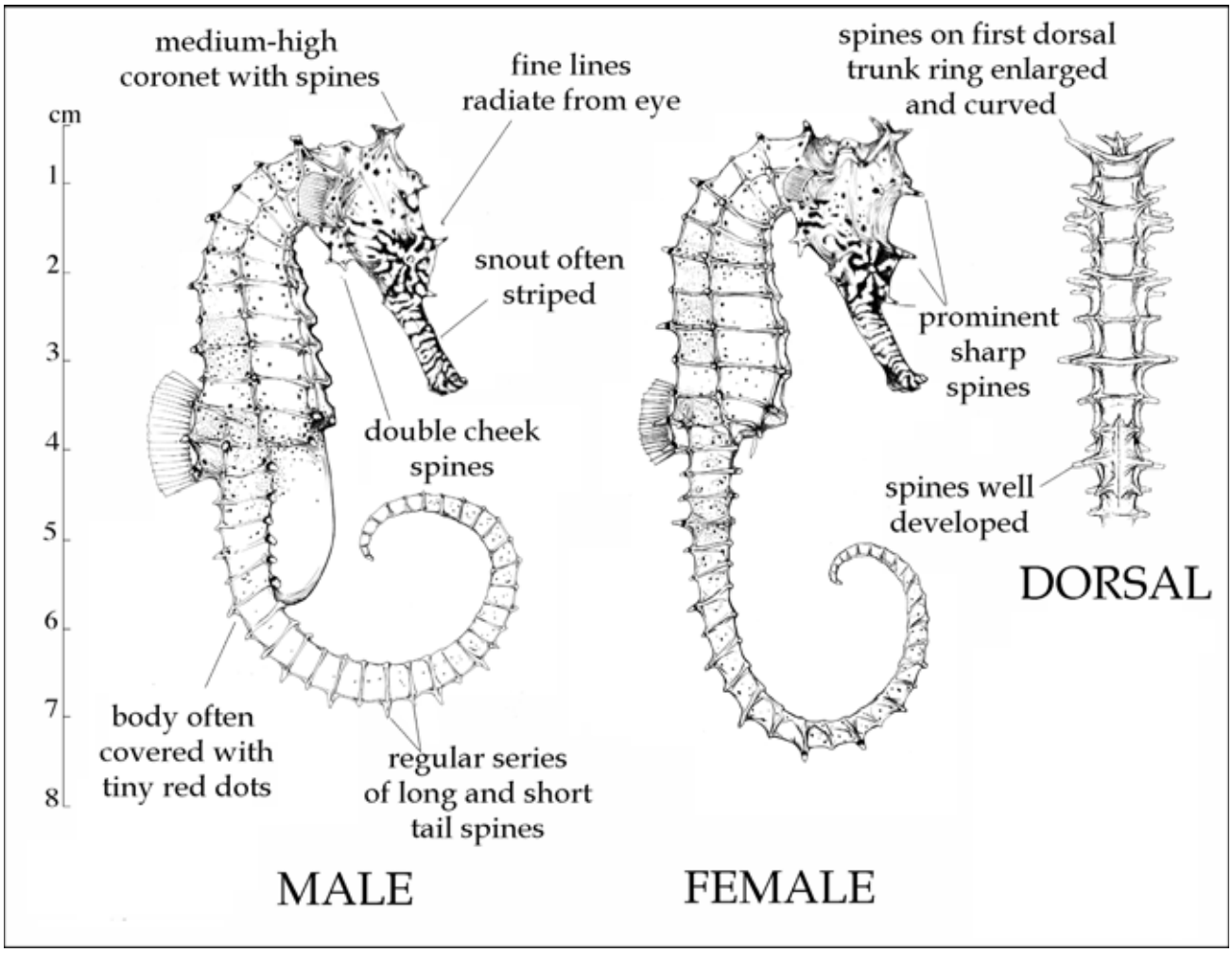
Similar species
- *H. barbouri* has a higher coronet, more dorsal and pectoral fin rays, and better-developed spines in the neck region
- *H. histrix* has a longer snout and a single cheek spine
- *H. subelongatus* has a higher coronet with a rounded or fluted top, no spines (except in young specimens) and thicker body rings. The body rings junctions do not have spines

Other notes
- This species has often been misidentified as *H. histrix*, but *H. histrix* is not known from Australia
- The name *H. angustus* has in the past been used to encompass *H. subelongatus*. The two are now recognised as separate species
- Specimens from the western end of the range tend to have longer snouts and blunter spines than those from further east

Hippocampus barbouri Jordan and Richardson 1908

Common names
Barbour's seahorse

Synonyms
H. aimei (*arnei*) Roulé 1916 (but only one of the specimens he described)



Description
Maximum recorded adult height: 15 cm[2]
Trunk rings: 11
Tail rings: 34–35 (33–36)
HL/SnL: 2.2 (2.0–2.6)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 19 (16–22)
Pectoral fin rays: 17–18 (15–20)
Coronet: Medium-high; five sharp spines
Spines: Well-developed, usually sharp eye spine; first dorsal trunk spine much longer than others and curved backwards; tail spines of different lengths in a regular series (e.g., long, short, long, short)
Other distinctive characteristics: Double cheek spines, double spines below eye

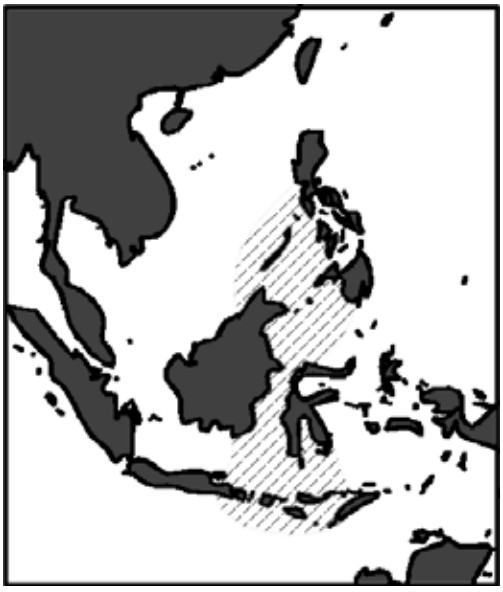
Colour/pattern: White to pale yellow to pale brown; reddish-brown spots and lines on body; snout often striped; fine lines radiating from eye

Confirmed distribution
Indonesia; Malaysia; Philippines

Suspected distribution
No other locations suspected

Habitat
Maximum reported depth 10 m[4]; shallow seagrass beds[2]; clinging to hard corals[41]

Life history
Maximum reported height at onset of sexual maturity 8 cm[42]; gestation duration 12–14 days[43]; length at birth averages 5 mm[43]; brood size 10–250 in captivity[43]



Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. barbouri* is listed as Vulnerable by IUCN[13]. This is among the most commonly traded species, with reports of declining availability in many areas[10]. In addition to the substantial demand for the species, its seagrass habitats are also threatened[44]

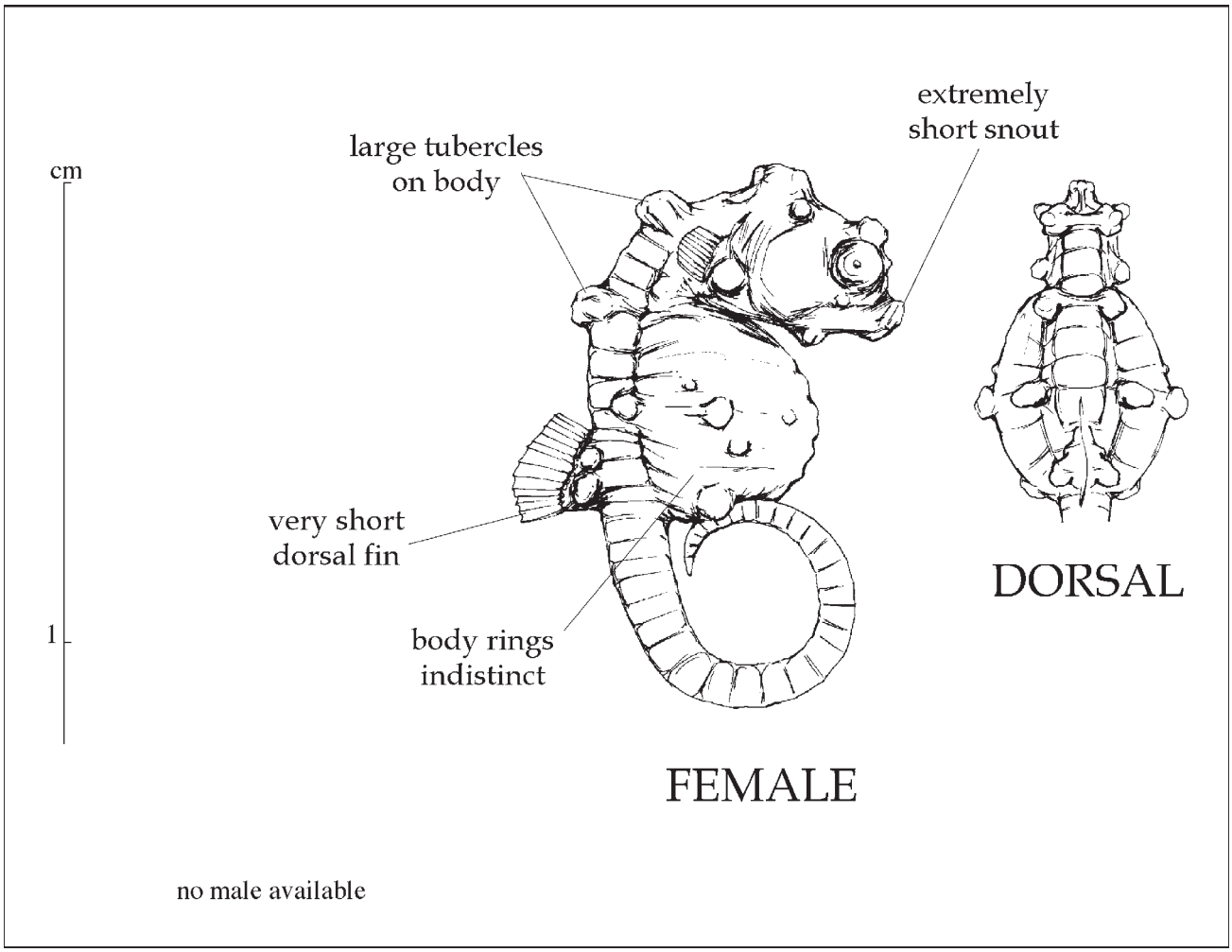
Similar species
- *H. angustus*, found in Australia, has a lower coronet, fewer dorsal and pectoral fin rays, and less-developed spines in the neck region
- *H. histrix* has a longer snout, fewer fin rays, sharper spines, and a single cheek spine
- *H. spinosissimus* has a deeper body, more tail rings, fewer dorsal fin rays, and a lower coronet. Its cheek spines usually are single and nose spine and pre-coronet spine are less prominent

Other notes
- Males have proportionally longer tails than do females[26]
- This species has often been misidentified as *H. histrix*
- *H. barbouri* probably encompasses several distinct forms. There is some genetic support for taxonomic subdivision of the species[40]

Hippocampus bargibanti Whitley 1970

Common names
Bargibant's seahorse (U.S.A.); pygmy seahorse (Australia)

Synonyms
None known

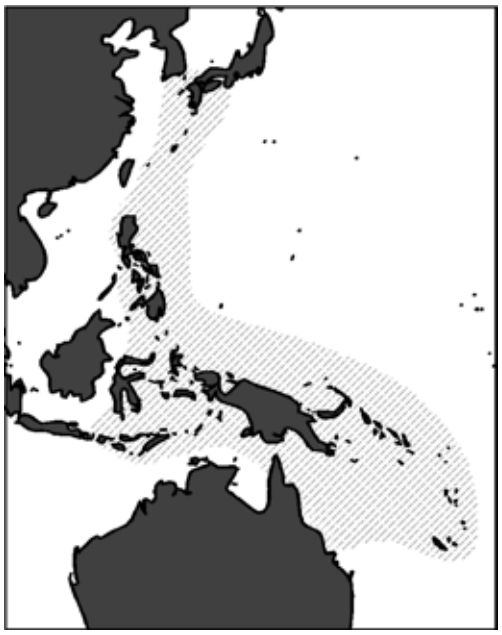


Description
Maximum recorded adult height: 2.4 cm[45]
Trunk rings: 11–12
Tail rings: 31–32 (31–33)
HL/SnL: 4.6 (4.3–5.4)
Rings supporting dorsal fin: 3 trunk rings (no tail rings)
Dorsal fin rays: 14 (13–15)
Pectoral fin rays: 10 (10–11)
Coronet: Rounded knob
Spines: Irregular bulbous tubercles scattered over body and tail; single, prominent rounded eye spine; single, low rounded cheek spine
Other distinctive characteristics: Head and body fleshy, mostly without recognisable body rings; ventral portion of trunk segments incomplete; snout extremely short

Colour/pattern: Two colour morphs are known: (a) pale grey or purple with pink or red tubercles (found on gorgonian coral *Muricella plectana*); and (b) yellow with orange tubercles (found on gorgonian coral *Muricella paraplectana*)

Confirmed distribution
Australia; France (New Caledonia); Indonesia; Japan; Papua New Guinea; Philippines

Suspected distribution
Federated States of Micronesia; Malaysia; Palau; Solomon Islands; Vanuatu



Habitat
Typically found at 16–40 m depth[46]; only known to occur on gorgonian corals of the genus *Muricella*[45, 46]

Life history
Breeding season year round[47]; adults usually found in pairs or clusters of pairs in the wild (up to 28 on a single gorgonian)[47]; gestation duration averages 2 weeks[48]; length at birth averages 2 mm[48]; brood size 34 from one male[47]

Trade
Not known in international trade

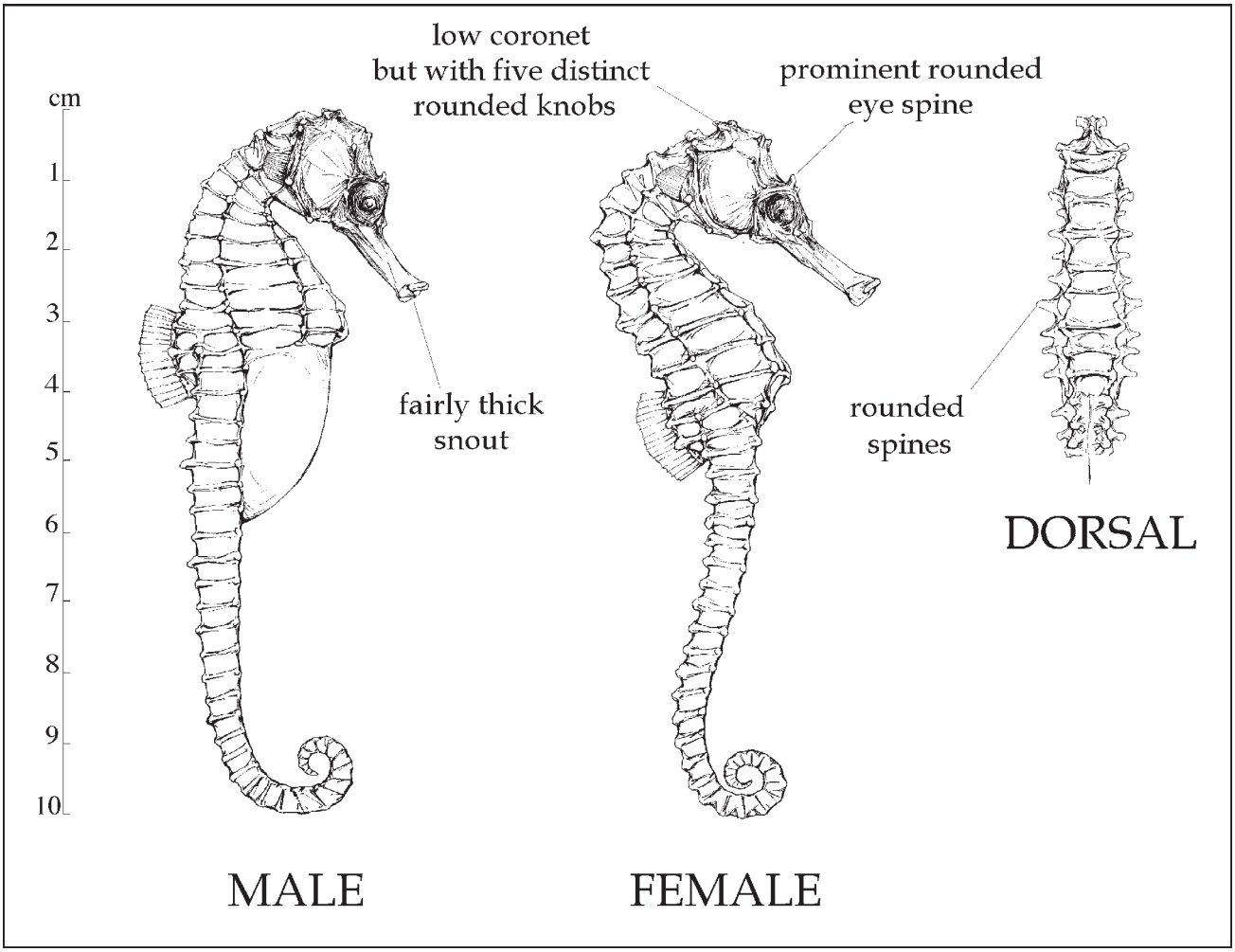
Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. bargibanti* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. bargibanti* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001

Similar species
- *H. denise* has few or no tubercles, no coronet, no cheek or eye spines, and a longer snout
- *H. minotaur*, found in southeast Australia, has no obvious tubercles on body and has a thicker neck and flatter body

Hippocampus borboniensis Duméril 1870

Common names
Réunion seahorse

Synonyms
None known



Description
Maximum recorded adult height: 14 cm[2]
Trunk rings: 11
Tail rings: 35–36 (34–38)
HL/SnL: 2.4 (2.1–2.8)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (16–18)
Pectoral fin rays: 15–16
Coronet: Low, with five rounded knobs
Spines: Well-developed rounded knobs
Other distinctive characteristics: Usually has prominent rounded eye spine
Colour/pattern: Dusty green-brown with dusty yellow dots and marbling and broken lines on head[49]; or dark and uniform

Confirmed distribution
France (Réunion); Madagascar; Mauritius; Mozambique; South Africa; United Republic of Tanzania

Suspected distribution
Comoros

Habitat
Typically found at 5–60 m depth[31]; soft-bottom, sponge[31]; seagrass beds[50]

Life history
Unknown

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. borboniensis* is listed as Data Deficient by IUCN[13]

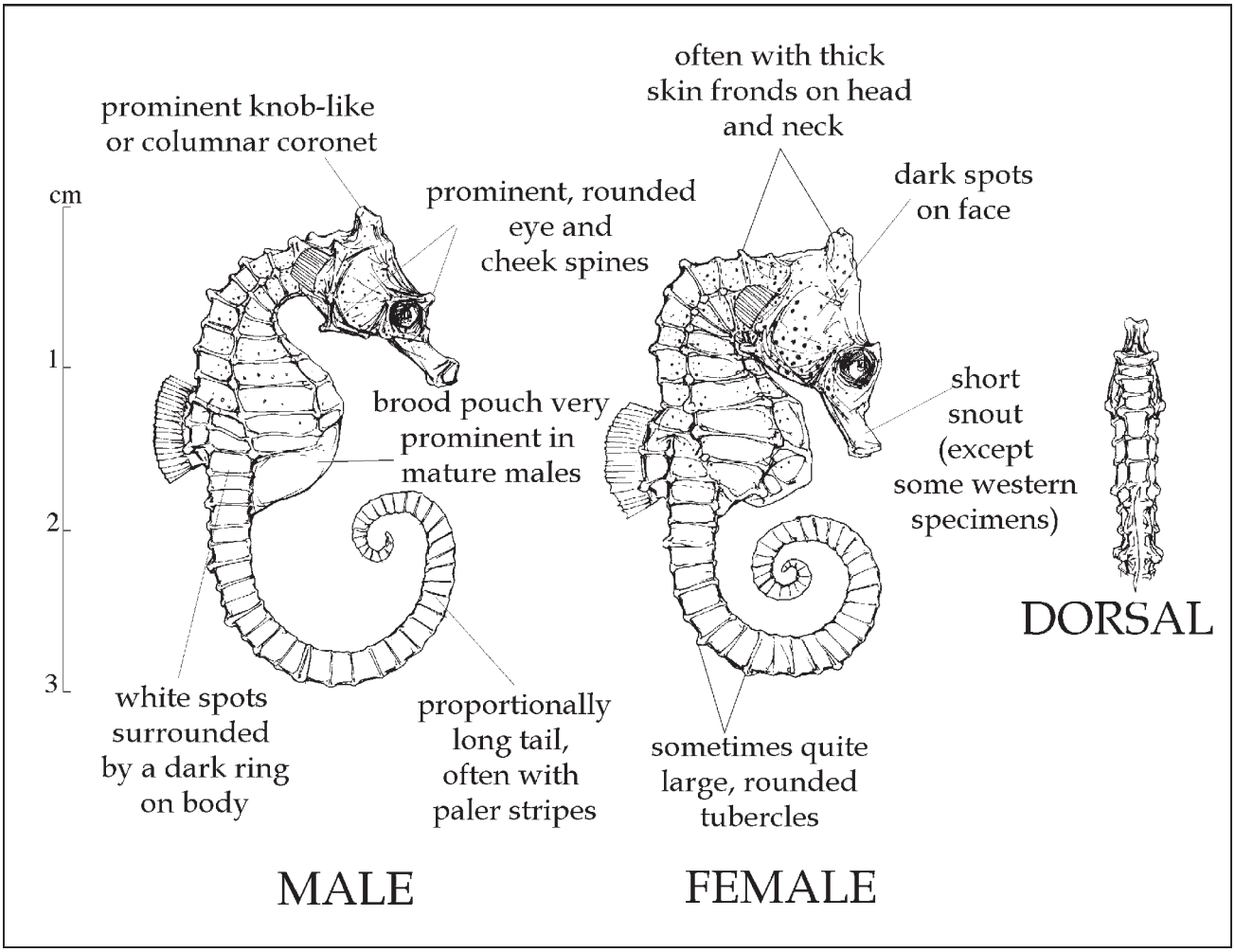
Similar species
- *H. fuscus* has a smaller body and smoother body surface, fewer tail rings, and a coronet that is not significantly raised above the arch of the neck
- *H. kuda* has a deeper head; a coronet that is curled backwards and rounded; cheek spines are more prominent and other spines less developed

Other notes
- Genetic research suggests that this species may be part of the *H. kuda* complex (see Appendix D)[40]

Hippocampus breviceps Peters 1869

Common names
Short-snouted seahorse (Australia); short-headed seahorse (Australia); knobby seahorse (U.S.A.)

Synonyms
H. tuberculatus Castelnau 1875



Description
Maximum recorded adult height: 10 cm[31]
Trunk rings: 11
Tail rings: 40 (39–43)
HL/SnL: 3.0 (2.4–3.5)
Rings supporting dorsal fin: 3 trunk rings and 1 tail ring
Dorsal fin rays: 20–21 (19–23)
Pectoral fin rays: 14–15 (13–15)
Coronet: Tall, columnar or knob-like
Spines: Irregularly developed; some spines are low; others are very prominent, rounded tubercles
Other distinctive characteristics: With or without mane of thick skin fronds on the head and neck region. Mature males have prominent brood pouch

Colour/pattern: Purplish brown, yellowish, reddish; numerous dark margined occelli (white spots); often with dark spots or patches, especially on head; ventral surface of tail has paler transverse stripes

Confirmed distribution
Australia

Suspected distribution
No other locations suspected

Habitat
Maximum reported depth 15 m; weedy, in *Sargassum*; sponge reef in deeper water[31]; rocky reef covered in macro algae[51]

Life history
Maximum reported height at onset of sexual maturity 4.6 cm[51]; found in groups[51]; egg diameter averages 1.6 mm[26]; length at birth averages 8.9 mm[26]; brood size usually 100[4]

Trade
Live trade for aquaria

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. breviceps* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. breviceps* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001

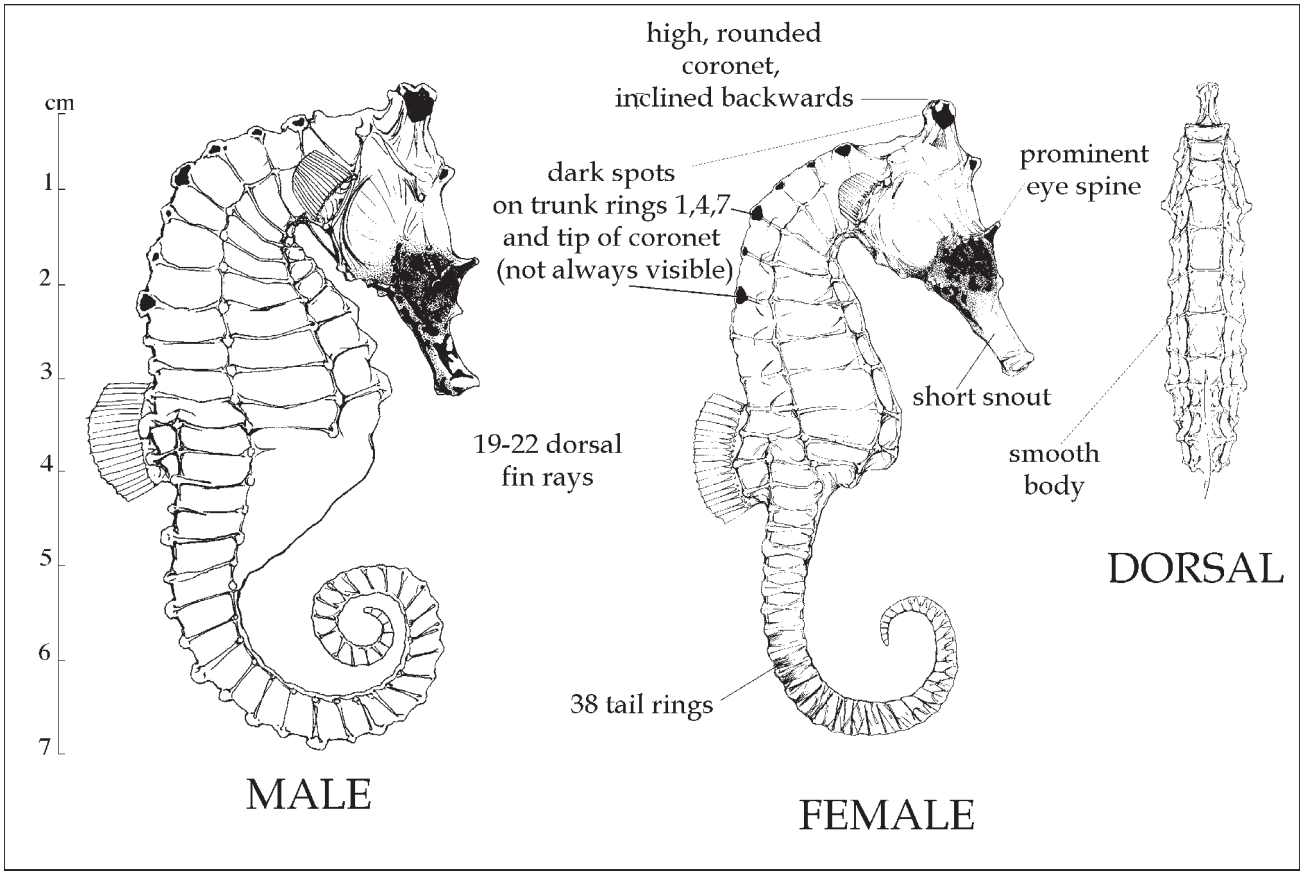
Similar species
Young *H. breviceps* are similar to young specimens of *H. abdominalis* but are easily distinguishable by the 12–13 trunk rings of *H. abdominalis*

Other notes
- Males have proportionally longer tails than do females[51]
- Some specimens seen from Western Australia have significantly longer, narrower snouts and may represent a separate species[52, 53]. The slender-snout form has only been recorded from the northern part of the species range

Hippocampus camelopardalis Bianconi 1854

Common names
Giraffe seahorse; *kameel-seeperdjie* and *kroon-seeperdjie* (Afrikaans; South Africa)

Synonyms
H. subcoronatus Günther 1866



Description
Maximum recorded adult height: 10 cm^2
Trunk rings: 11
Tail rings: 38
HL/SnL: 2.8 (2.7–2.9)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 19–22
Pectoral fin rays: 17–18
Coronet: Very high, inclined backwards, with a rounded top
Spines: Variable
Other distinctive characteristics: Prominent eye spine and short snout (less than one-half head length). Some specimens show prominent spine in front of coronet
Colour/pattern: Variable. Dark spot on top of coronet and dark spots on the dorso-lateral surface of the first, fourth and seventh trunk rings (not always visible)

Confirmed distribution
Mozambique; South Africa; United Republic of Tanzania

Suspected distribution
No other locations suspected

Habitat
Maximum reported depth 45 m[54]; seagrass, algal beds, shallow reef[4]

Life history
Unknown

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. camelopardalis* is listed as Data Deficient by IUCN[13]

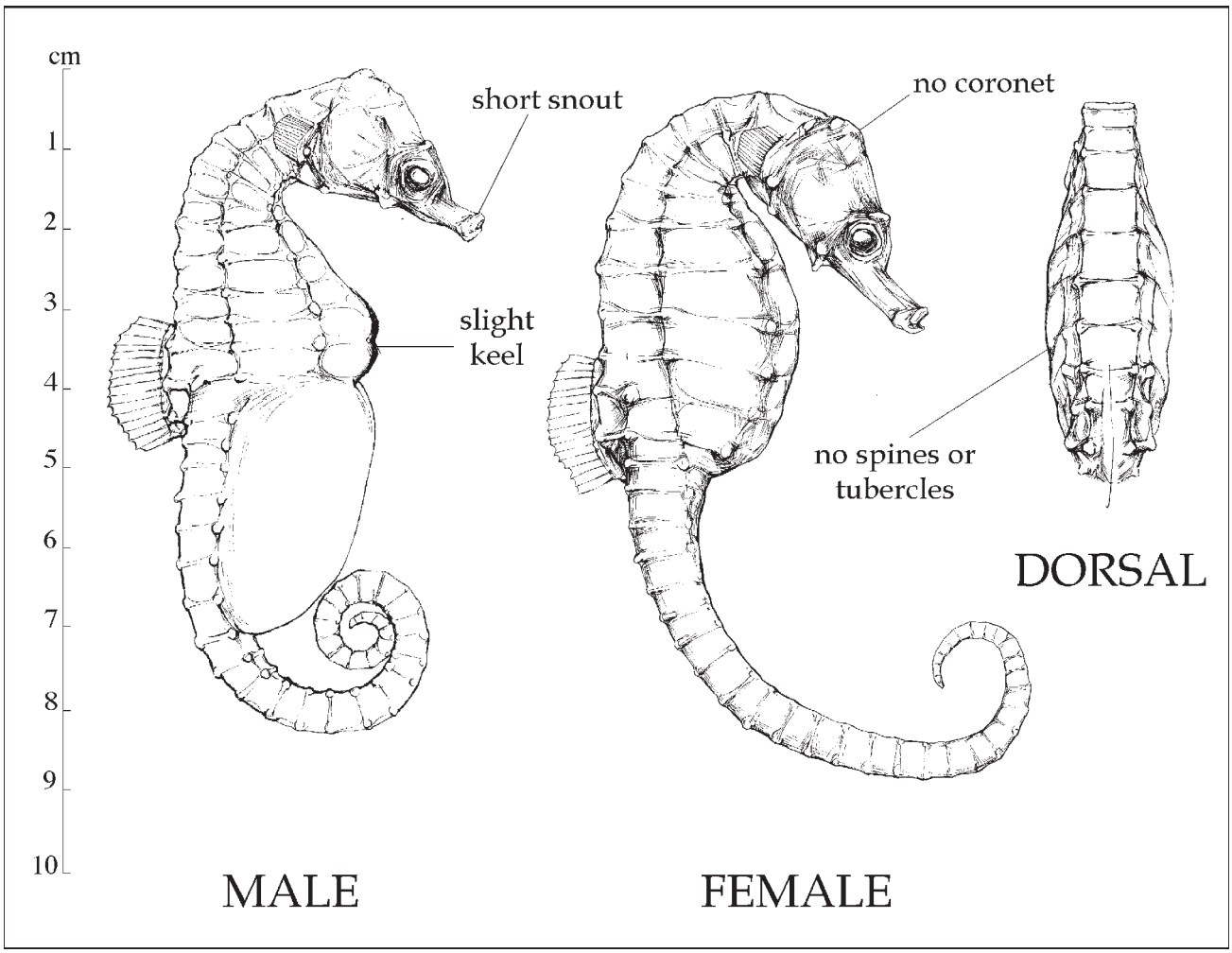
Similar species
- *H. trimaculatus* has three spots on dorsal surface but a very low coronet; not known further west than India
- *H. whitei*, found in southeast Australia, has a longer snout, fewer dorsal fin rays, and better-developed spines

Other notes
- References to *H. whitei* off the east coast of Africa should be *H. camelopardalis,* genetic data indicate that this is distinct from *H. whitei* in Australia[40]

Hippocampus capensis Boulenger 1900

Common names
Knysna seahorse; Cape seahorse; *Knysna-seeperdjie* (Afrikaans; South Africa)

Synonyms
None known



Description
Maximum recorded adult height: 12 cm[55]
Trunk rings: 11
Tail rings: 34 (32–37)
HL/SnL: 3.0
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (16–18)
Pectoral fin rays: 15 (14–17)
Coronet: None: arch of neck is a smooth curve. Juveniles may have a small coronet but this disappears as they mature
Spines: None on body; short and blunt on tail
Other distinctive characteristics: Short snout; male has slight keel
Colour/pattern: Usually mottled greenish or brownish; can have scattered dark spots on body

Confirmed distribution
South Africa

Suspected distribution
No other locations suspected

Habitat
Typically found at 0.5–20 m depth[55]; estuarine, submerged vegetation, tolerates salinity from 1–59 parts per thousand[56]

Life history
Maximum reported height at onset of sexual maturity 5 cm[56]; breeding season September to April[55]; found in pairs in the wild[57]; sexually monogamous[57]; gestation duration averages 4 weeks[15]; length at birth averages 11 mm[15]; maximum reported brood size 120[56]; planktonic immediately after birth[56]

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. capensis* is listed as Endangered by IUCN[13]. *H. capensis* is protected by the Cape Nature Conservation Ordnance 19 (1974) and the CNC Proclamation 109 (1988), which prohibits harvesting without a permit; the species is listed in the South African Red Book of Fishes. It has the smallest known range of any seahorse; development and tourism are putting heavy pressure on the Knysna Estuary and freshwater floods have caused heavy seahorse mortality[56, 58]

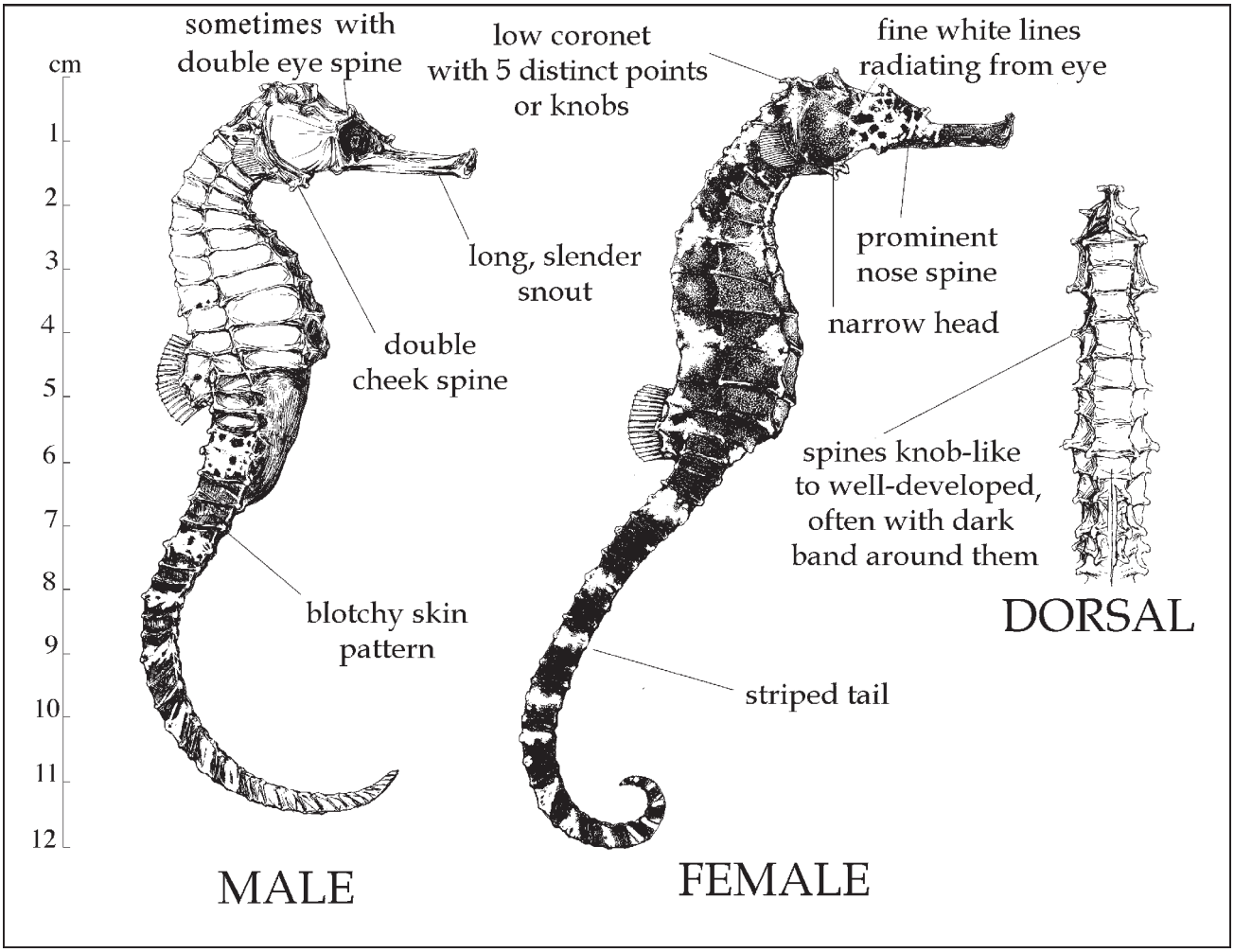
Similar species
- *H. hippocampus*, found in the Mediterranean and eastern Atlantic, has more tail rings, a higher, ridge-like or wedge-shaped coronet, ad prominent eye spine

Other notes
- Males are longer and heavier than females and have proportionally longer tails[55, 58]
- Genetic data suggest that *H. capensis* is closely related to species in the *H. kuda* complex (see Appendix D)[40]

Hippocampus comes Cantor 1850

Common names
Tiger tail seahorse (U.S.A.)

Synonyms
None known



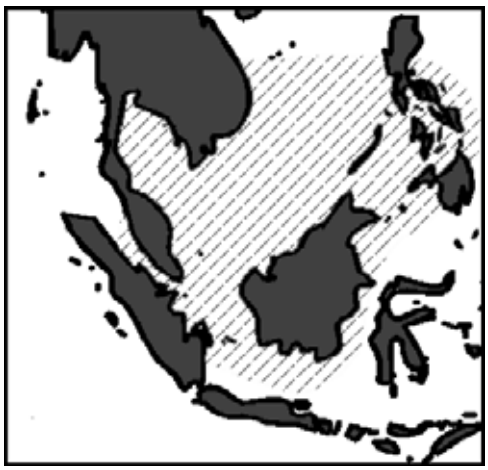
Description
Maximum recorded adult height: 18.7 cm[59]
Trunk rings: 11
Tail rings: 35–36 (34–37)
HL/SnL: 2.2 (1.9–2.5)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18 (17–19)
Pectoral fin rays: 17 (16–19)
Coronet: Small and low, with five distinct rounded knobs or spines
Spines: Range from knob-like and blunt to well-developed and sharp; often with dark band near tip
Other distinctive characteristics: Cheek spines are double; double spines below and sometimes also above eye; prominent, sharp nose spine; long, slender snout

Colour/pattern: Commonly hues of yellow and black, sometimes alternating; striped tail (although this may not be visible in dark specimens); mottled or blotched pattern on body; may have fine white lines radiating from eye

Confirmed distribution
Indonesia; Malaysia; Philippines; Singapore; Thailand; Viet Nam

Suspected distribution
No other locations suspected

Habitat
Typically found at <10 m depth[60]; maximum reported depth 20 m[4]; coral reef, sponge gardens, kelp, floating *Sargassum*[61]; thought to prefer *Sargassum* as juveniles, moving to corals and sponges when older[62]



Life history
Maximum reported height at onset of sexual maturity 8 cm[62]; breeding season year round in central Philippines[62]; found in pairs in the wild[61]; egg diameter averages 1.4 mm[26]; gestation duration 2–3 weeks[62]; length at birth averages 9 mm[26]; brood size 200–350[63]; planktonic immediately after birth[64]

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. comes* is listed as Vulnerable by IUCN[13]. The species is targeted by fishers supplying a substantial trade in seahorses for medicinal and aquarium uses; it is also incidentally caught (bycatch) in other fisheries and is affected by habitat degradation[65]. Fishers in the central Philippines estimate that populations declined by up to 70 percent over the 10 years prior to 1995[66]

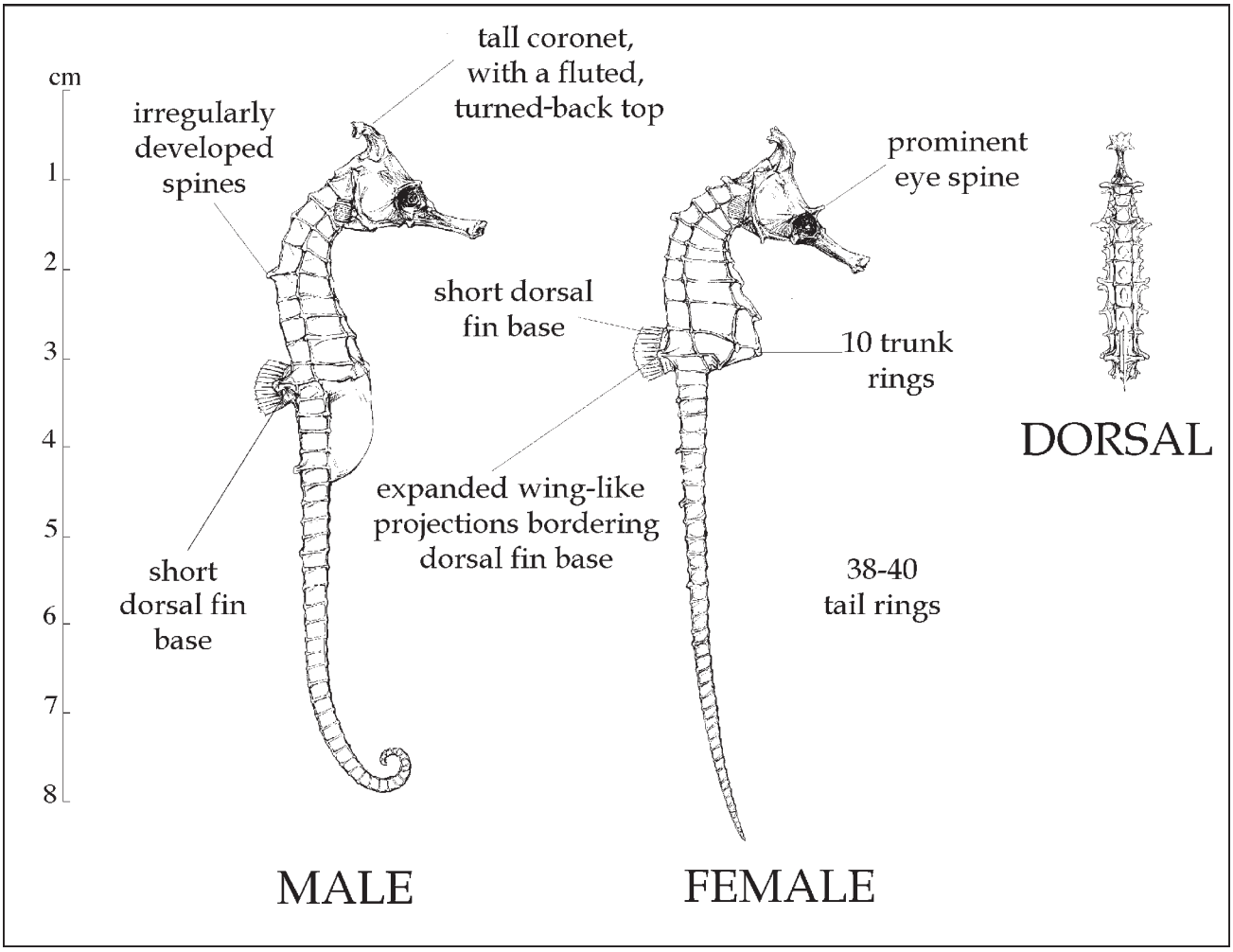
Similar species
- *H. kuda* has a deeper head and thicker snout, low rounded spines or a smooth body, and a single rounded cheek spine. It lacks the distinctive markings of *H. comes*
- *H. spinosissimus* has a thicker snout, more tail rings, and a higher coronet with longer spines. Its spines are more pronounced and lack the dark band of *H. comes*, and cheek spines usually single

Other notes
- *H. comes* has commonly been synonymised with *H. kuda* but this is not supported by genetic and morphometric data[40]

Hippocampus coronatus Temminck and Schlegel 1850

Common names
Crowned seahorse; *tatsu-no-otoshigo* (Japanese; Japan) (this may refer to *H. sindonis. See Other notes*)

Synonyms
None known

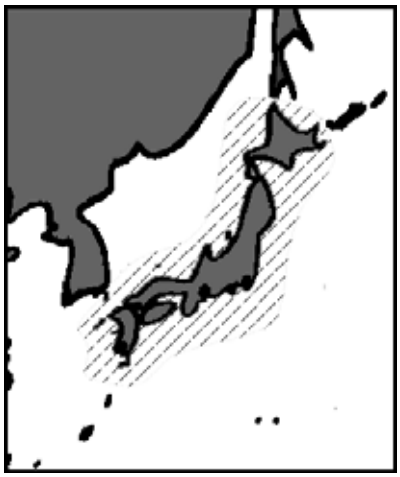


Description
Maximum recorded adult height: 12.7 cm[67]
Trunk rings: 10
Tail rings: 39 (38–40)
HL/SnL: 2.4 (2.3–2.5)
Rings supporting dorsal fin: 2 trunk rings (no tail rings)
Dorsal fin rays: 14
Pectoral fin rays: 12
Coronet: Extremely tall, turned backwards with a fluted tip
Spines: Irregular. Most body angles lack spines; where they are present they are often long, thin and blunt-tipped

Other distinctive characteristics: Short dorsal fin base, bordered by expanded wing-like projecting spines; prominent eye spine
Colour/pattern: Yellowish, marbled with dark brown; black dorsal surface[49]

Confirmed distribution
Japan

Suspected distribution
No other locations suspected



Habitat
Among *Sargassum* close to shore[68]

Life history
Breeding season June to July[68]; length at birth approximately 9 mm[68]; brood size "several hundred"[68] (reference may be to *H. sindonis*)

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. coronatus* is listed as Data Deficient by IUCN[13]

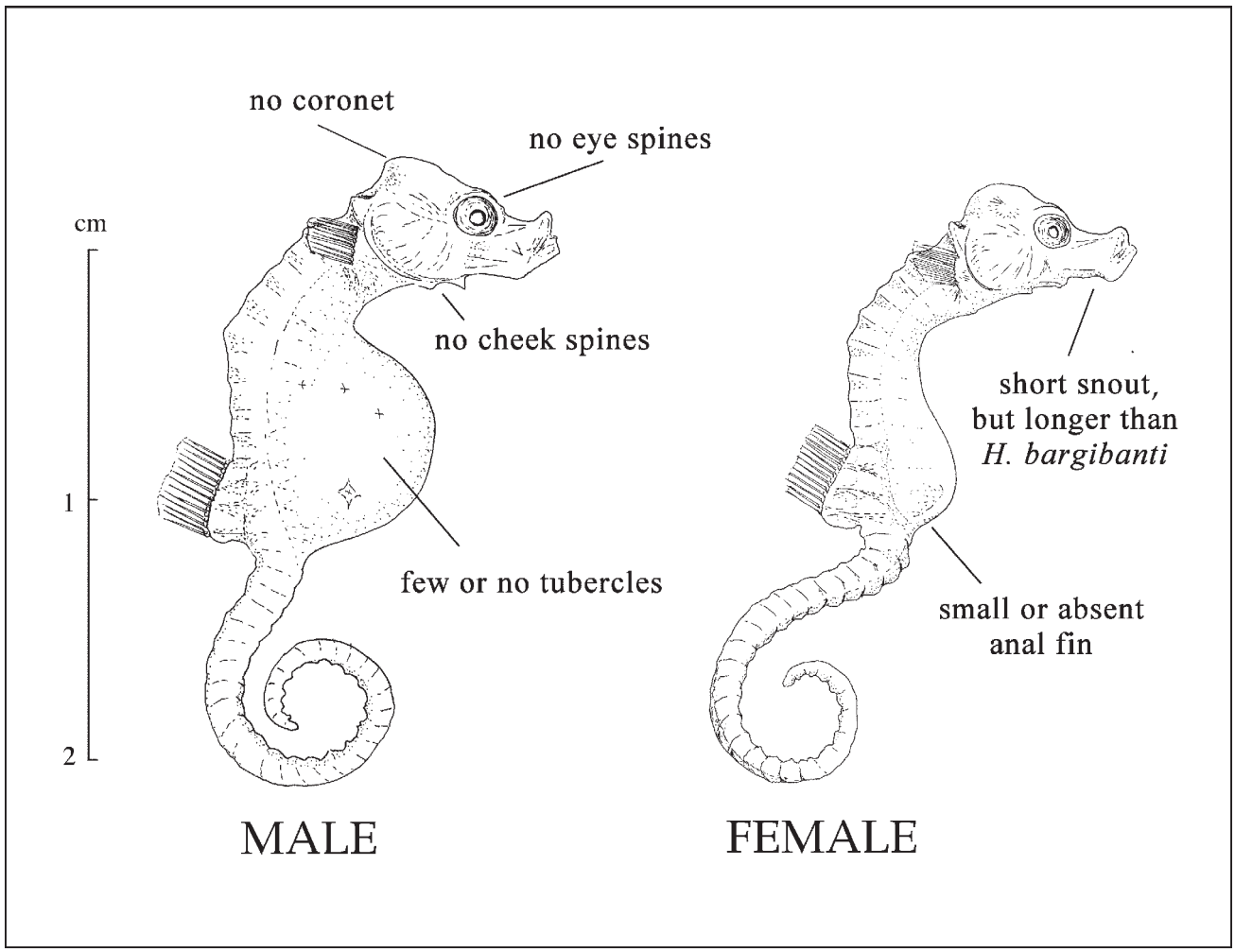
Similar species
- *H. sindonis* has fewer tail rings, a lower, angular coronet, a longer dorsal fin base and lacks the wing-like projections on either side of the dorsal fin base

Other notes
- The name *H. coronatus* has in the past been applied to *H. sindonis*. Morphometric data indicates that these are different species[2]

Hippocampus denise Lourie and Randall 2003

Common names
Denise's pygmy seahorse

Synonyms
None known



Description
Maximum recorded adult height: 2.14 cm[8]
Trunk rings: 12
Tail rings: 28–29
HL/SnL: 3.3 (2.8–3.7)
Rings supporting dorsal fin: 3 trunk rings (no tail rings)
Dorsal fin rays: 14
Pectoral fin rays: 10 (10–11)
Coronet: No raised coronet
Spines: None
Other distinctive characteristics: Limited number of tubercles on the body
Colour/pattern: Plain orange with slightly darker rings around tail

Confirmed distribution
Indonesia; Malaysia; Federated States of Micronesia; Palau; Papua New Guinea; Philippines; Solomon Islands; Vanuatu

Suspected distribution
No other locations suspected

Habitat
Typically found at 13–90 m depth[8]; in association with gorgonian seafans identified as *Annella reticulata* (Ellis and Solander 1786), *Muricella* sp. Verrill 1869, and *Echinogorgia* sp. Kölliker 1865[8]

Life history
Pregnant males have been found in February, May and October, suggesting a year-round breeding season[8]

Trade
Not known in international trade

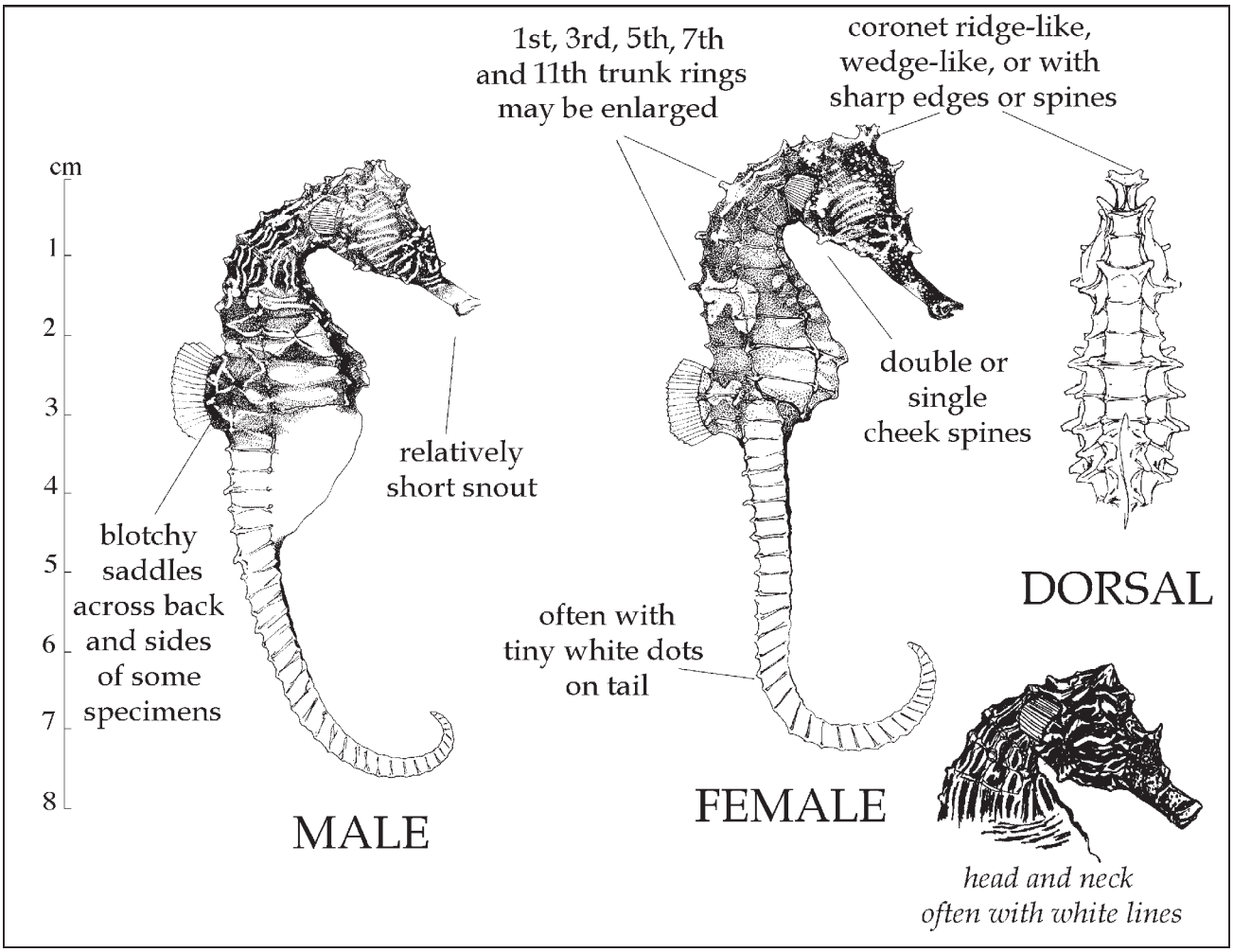
Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. denise* is listed as Data Deficient by IUCN[13]

Similar species
- *H. bargibanti* differs in head and body shape and has a number of additional tubercles on its ventral trunk region; it also may be differentiated by the number of tail rings. There is also no significant external shape difference between the two sexes
- *H. minotaur* has a different tail ring and fin ray count and larger head and neck

Hippocampus erectus Perry 1810

Common names
Lined seahorse; northern seahorse (U.S.A.); *hippocampe rayé* (French); *caballito de mar* (Spanish; Mexico)

Synonyms
H. tetragonous Mitchill 1814; *H. hudsonius* DeKay 1842; *H. punctulatus* Guichenot 1853; *H. fascicularis* Kaup 1856; *H. marginalis* Kaup 1856; *H. laevicaudatus* Kaup 1856; *H. villosus G*ünther 1880; *H. stylifer* Jordan and Gilbert 1882; *H. kincaidi* Townsend and Barbour 1906; *H. brunneus* Bean 1906



Description
Maximum recorded adult height: 19 cm[2]
Trunk rings: 11
Tail rings: 36 (34–39)
HL/SnL: 2.6 (2.2–3.5)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18–19 (16–20)
Pectoral fin rays: 15–16 (14–18)
Coronet: Variable, low, triangular wedge; ridge-like or raised with sharp edges; or with relatively sharp spines
Spines: Variable from none to well-developed with blunt or sharp tips
Other distinctive characters: Deep-bodied; may have enlarged first, third, fifth, seventh and eleventh trunk rings (in most other species the enlarged rings are the first, fourth, seventh and eleventh); snout is usually less than one-half head length; cheek spine may be single or double

Colour/pattern: Base colour is variable, ranging from ash grey, orange, brown, yellow, and red to black (brown specimens tend to be paler on the ventral side); often with a characteristic pattern of white lines following the contour of the neck and tiny white dots on the tail. May have darker or paler saddles across the dorsal surface, often in line with the more enlarged body rings

Confirmed distribution
Bahamas; Belize; Canada; Cuba; Guatemala; Haiti; Honduras; Mexico; Nicaragua; Panama; Saint Kitts and Nevis; United Kingdom of Great Britain and Northern Ireland (Caribbean territories); United States of America; Venezuela

Suspected distribution
Antigua and Barbuda; Argentina; Barbados; Brazil; Columbia; Costa Rica; Dominica; Dominican Republic; France (Caribbean territories); France (French Guiana); Grenada; Guyana; Jamaica; Netherlands (Caribbean territories); Saint Lucia; Saint Vincent and the Grenadines; Suriname; Trinidad and Tobago; Uruguay; United States of America (Caribbean territories)

Habitat
Maximum reported depth 73 m[18]; seagrass, sponges, floating *Sargassum*[69]

Life history
Maximum reported height at onset of sexual maturity 5.6 cm[70] ; breeding season May to October[71]; egg diameter averages 1.5mm[26]; gestation duration 20–21 days[72]; length at birth averages 11 mm[15]; brood size usually 250–300[72]; maximum reported brood size 1552[71]

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. erectus* is listed as Vulnerable by IUCN[13]. Mexican populations are listed in the NOM-059-SEMARNAT-2001 as species subject to special protection; Mexico prohibits the intentional capture and trade of wild seahorses, permitting only the commercialisation of cultured and incidentally caught seahorses. The species is caught in shrimp trawling and by other fisheries, and is affected by habitat degradation due to coastal development and pollution[73]

Similar species

- *H. hippocampus* is smaller; has a shorter snout and is restricted to the Mediterranean and eastern Atlantic
- *H. reidi* has a narrower body, a rounded coronet, and a head that is less deep

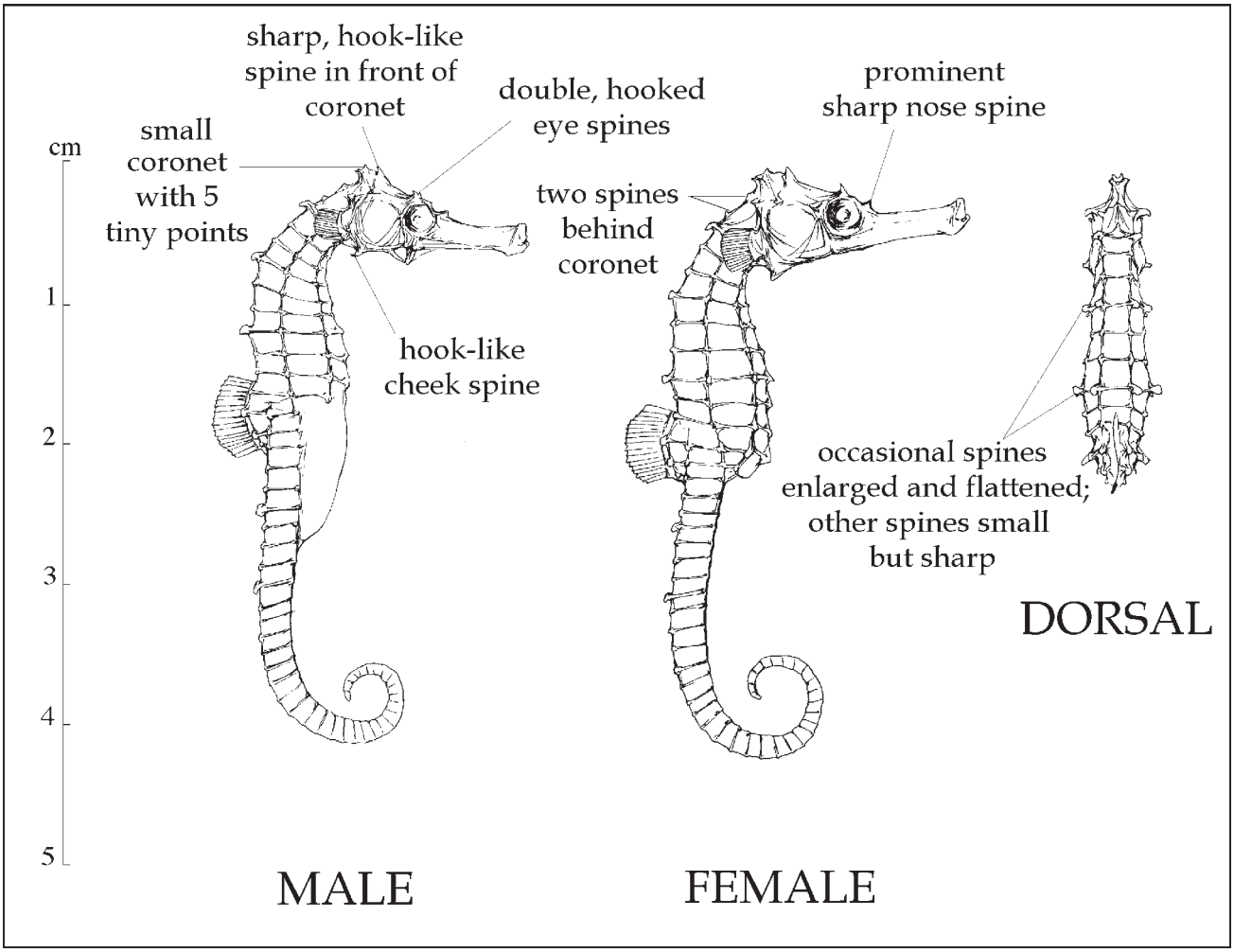
Other notes

- Males have proportionally longer tails than do females[70]
- Known to develop elaborate skin fronds
- *H. erectus* has variable forms and may represent more than one species
- Specimens from Argentina and Brazil appear to be genetically distinct from north Atlantic specimens, and may prove to be a separate species[40]

Hippocampus fisheri Jordan and Evermann

Common names
Fisher's seahorse

Synonyms
None known

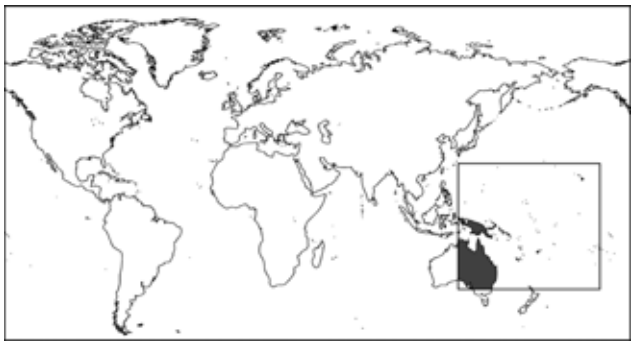


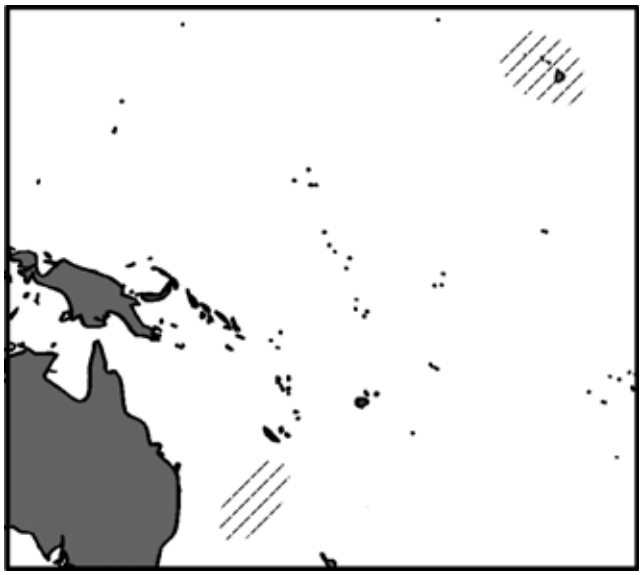
Description
Maximum recorded adult height: 8 cm^2
Trunk rings: 11
Tail rings: 37–38 (36–39)
HL/SnL: 2.2 (2.2–2.3)
Rings supporting dorsal fin: 2–3 trunk rings and 1–2 tail rings
Dorsal fin rays: 17–18
Pectoral fin rays: 15 (13–16)
Coronet: Slightly raised, with five tiny sharp points
Spines: Small but sharp; a few spines expanded and flattened
Other distinctive characters: Small, sharp, slightly hooked double eye and cheek spines; prominent, sharp, hook-like spine in front of coronet; two spines behind coronet

Colour/pattern: Golden orange, red or pink; enlarged knobs are brighter in colour; head, crown and snout are orange-brown; male pouch is paler than rest of body; some specimens have blackish mottling[74]

Confirmed distribution
United States of America (Hawaii)

Suspected distribution
Australia; France (New Caledonia)





Habitat
Unknown

Life history
Unknown

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. fisheri* is listed as Data Deficient by IUCN[13]

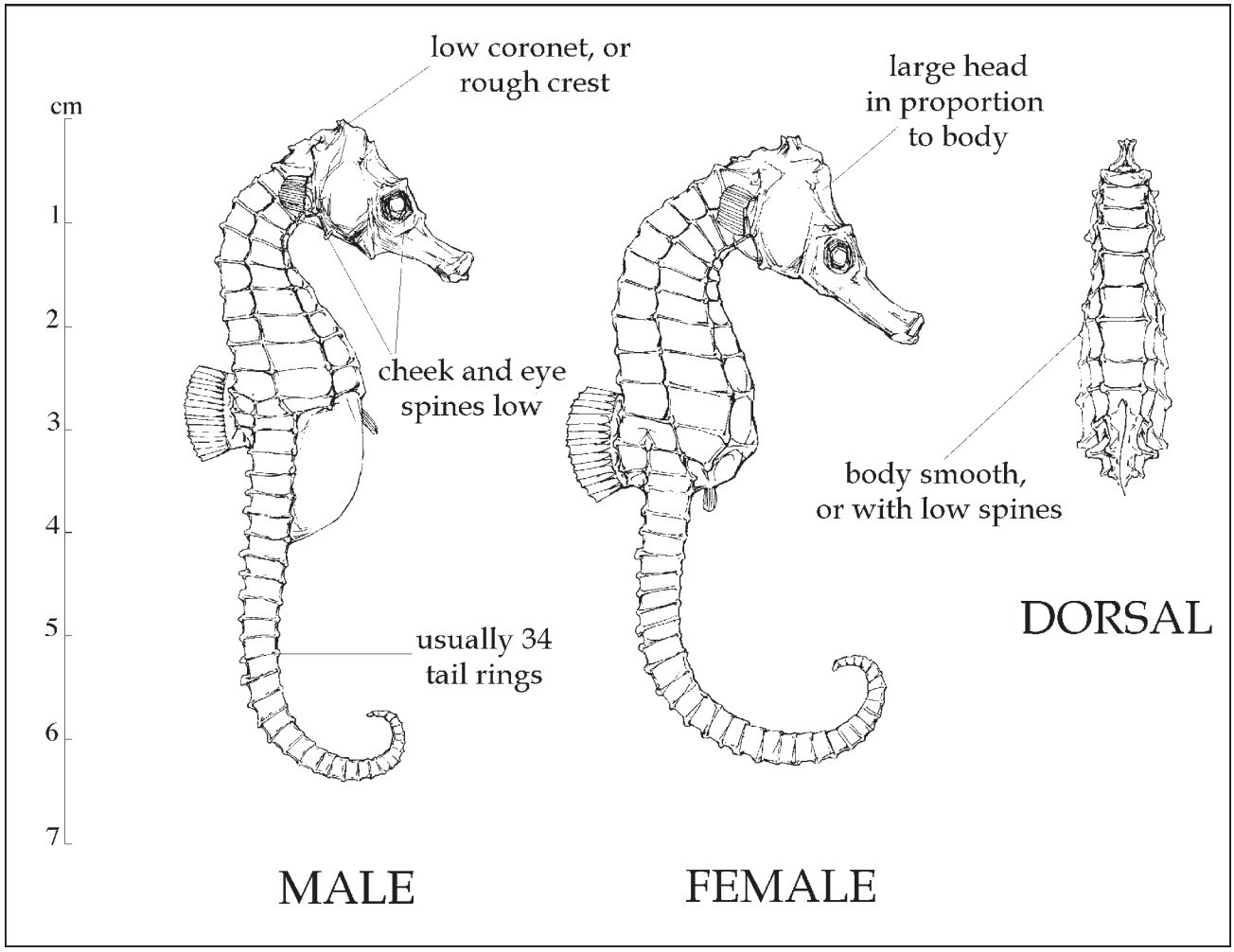
Similar species
- *H. trimaculatus*, found in Southeast Asia and northern Australia, has more tail rings and more dorsal and pectoral fin rays; a lower coronet; single eye and cheek spines; no nose spine; and often has three black spots on the dorso-lateral surface

Other notes
- Specimens from Lord Howe Island in Australia and New Caledonia have tentatively been assigned to *H. fisheri*, but further research is needed to confirm the species occurrence in these areas

Hippocampus fuscus Rüppell 1838

Common names
Sea pony

Synonyms
H. brachyrhynchus Duncker 1914; *H. natalensis* von Bonde 1924



Description
Maximum recorded adult height: 14.4 cm[75]
Trunk rings: 11
Tail rings: 34 (33–37)
HL/SnL: 2.7 (2.4–3.0)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 16 (14–17)
Pectoral fin rays: 15 (14–16)
Coronet: Low; arch of neck is a smooth curve or is slightly raised and rough
Spines: Low, smooth or slightly developed
Other distinctive characteristics: Head large compared to body; deep head
Colour/pattern: Usually dark but can be bright yellow; specimens from Suez are pale with marbled pattern of brown lines on trunk and head

Confirmed distribution
Djibouti; India; Saudi Arabia; Sri Lanka

Suspected distribution
Bahrain; Comoros; Cyprus; Egypt; Eritrea; France (Réunion); Islamic Republic of Iran; Israel; Kenya; Kuwait; Lebanon; Madagascar; Mauritius; Mozambique; Oman; Pakistan; Qatar; Seychelles; Somalia; South Africa; Sudan; Syria; Turkey; United Arab Emirates; United Republic of Tanzania; Yemen

Habitat
Maximum reported depth 10 m[75]; artificial structures, stones, gravel, harbours and bays with calm water[75]; shallow, protected waters on the edges of algal reefs or seagrass beds[4]

Life history
Found in pairs in captivity[26]; sexually monogamous in captivity[26]; egg diameter averages 1.7 mm[26]; gestation duration averages 14 days[26]; length at birth averages 7.5 mm[15]; maximum reported brood size 150[75]

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. fuscus* is listed as Data Deficient by IUCN[13]. Indian populations were moved under Schedule-I of the Wildlife Protection Act (1972) in 2001 which bans any collection or trade

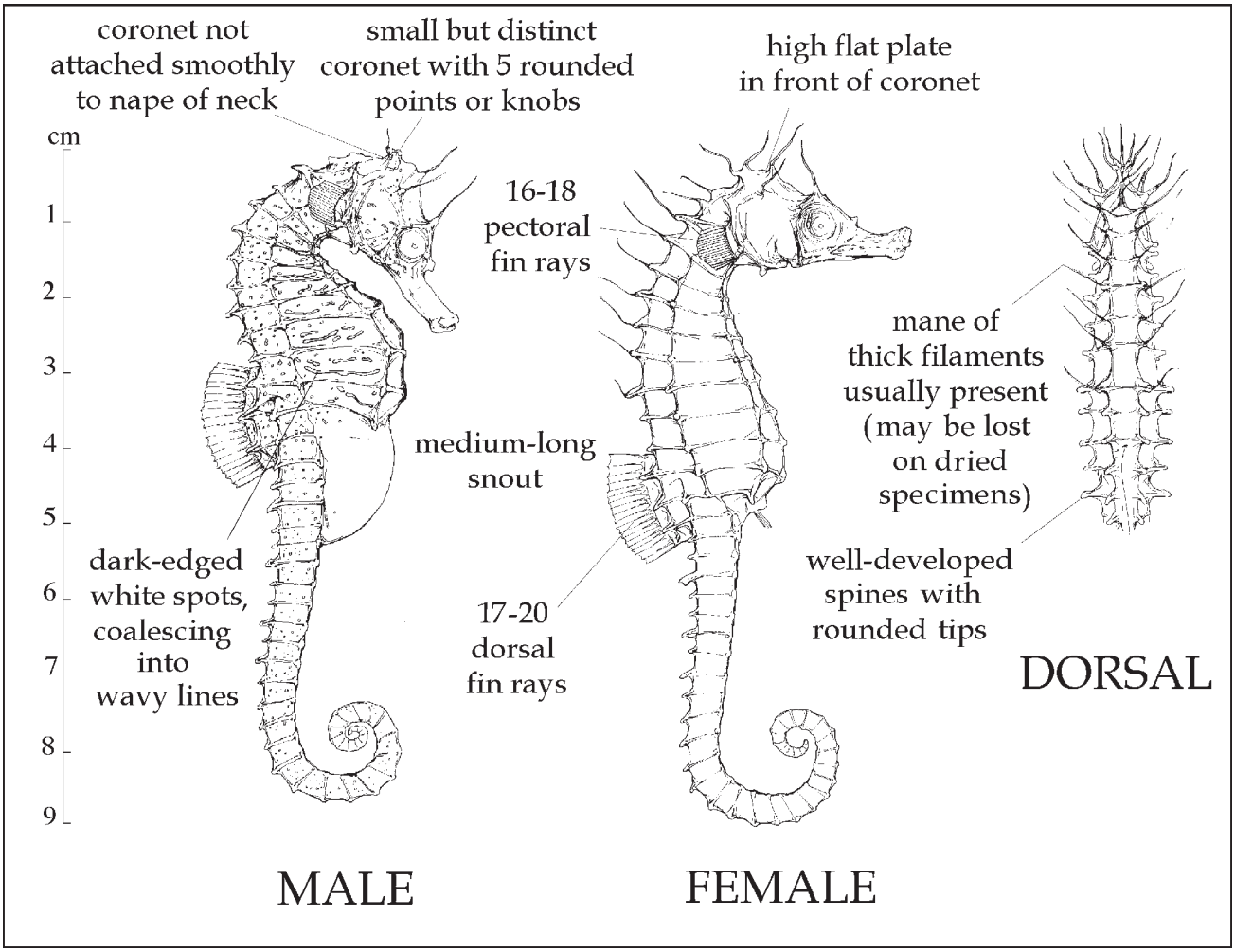
Similar species
- *H. borboniensis* has more tail rings, enlarged, knob-like spines, and a better-developed coronet with five rounded knobs
- *H. hippocampus*, found in the Mediterranean and eastern Atlantic, has more tail rings, more dorsal fin rays, and fewer pectoral fin rays
- *H. kuda* has a larger body and deeper head, usually more tail rings, and a more pronounced but rounded coronet

Other notes
- Males have proportionally longer tails and shorter snouts than do females[26]
- Genetic data suggest specimens from India are part of the *H. kuda* complex (see Appendix D)[40]

Hippocampus guttulatus Cuvier 1829

Common names
Long-snouted seahorse

Synonyms
H. hippocampus microstephanus Slastenenko 1937; *H. hippocampus microcoronatus* Slastenenko 1938; *H. guttulatus multiannularis* Ginsburg 1937; *H biscuspis* Kaup 1856



Description
Maximum recorded adult height: 18 cm[2]
Trunk rings: 11
Tail rings: 37–39 (35–40)
HL/SnL: 2.6 (2.3–2.9)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 19–20 (17–20)
Pectoral fin rays: 17 (16–18)
Coronet: Small but distinct, with 5 rounded knobs or blunt points; horizontal plate in front of coronet, as high as coronet itself and with a more or less prominent spine at its front edge; coronet not joined smoothly to neck
Spines: Medium to well-developed, with blunt tips

Other distinctive characteristics: Prominent, rounded eye spines; often has a mane of thick skin fronds on neck and head
Colour/pattern: Variable brown; prominent white spots on body, often with a dark ring around them, that tend to coalesce into horizontal wavy lines[76]; may be variously mottled or with pale saddles across dorso-lateral surface

Confirmed distribution
Croatia; Cyprus; France; Greece; Italy; Malta; Morocco; Netherlands; Portugal; Spain; United Kingdom of Great Britain and Northern Ireland

Suspected distribution
Albania; Algeria; Belgium; Bosnia and Herzegovina; Egypt; Israel; Lebanon; Libya; Monaco; Serbia and Montenegro; Senegal; Slovenia; Syria; Tunisia; Turkey

Habitat
Maximum reported depth 12 m[77]; shallow inshore waters in seaweeds and algal stands[4, 78]; deeper depths and rocky areas in winter[79]

Life history
Height at which 50 per cent of the population has reached sexual maturity 10 cm[77]; breeding season March to October[80]; found in groups in the wild[77]; egg diameter averages 2 mm[15]; gestation duration 3–5 weeks[76]; length at birth averages 12 mm[15]; maximum reported brood size 581[81]; planktonic immediately after birth[81]

Trade
Dried for curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. guttulatus* is listed as Data Deficient by IUCN[13]. *H. guttulatus* is listed in the Red Data Books of France and Portugal; the species is protected in Slovenia under the 1993 Protection of Threatened Animal Species Act, which prohibits trade in and bans the keeping of the animal in captivity

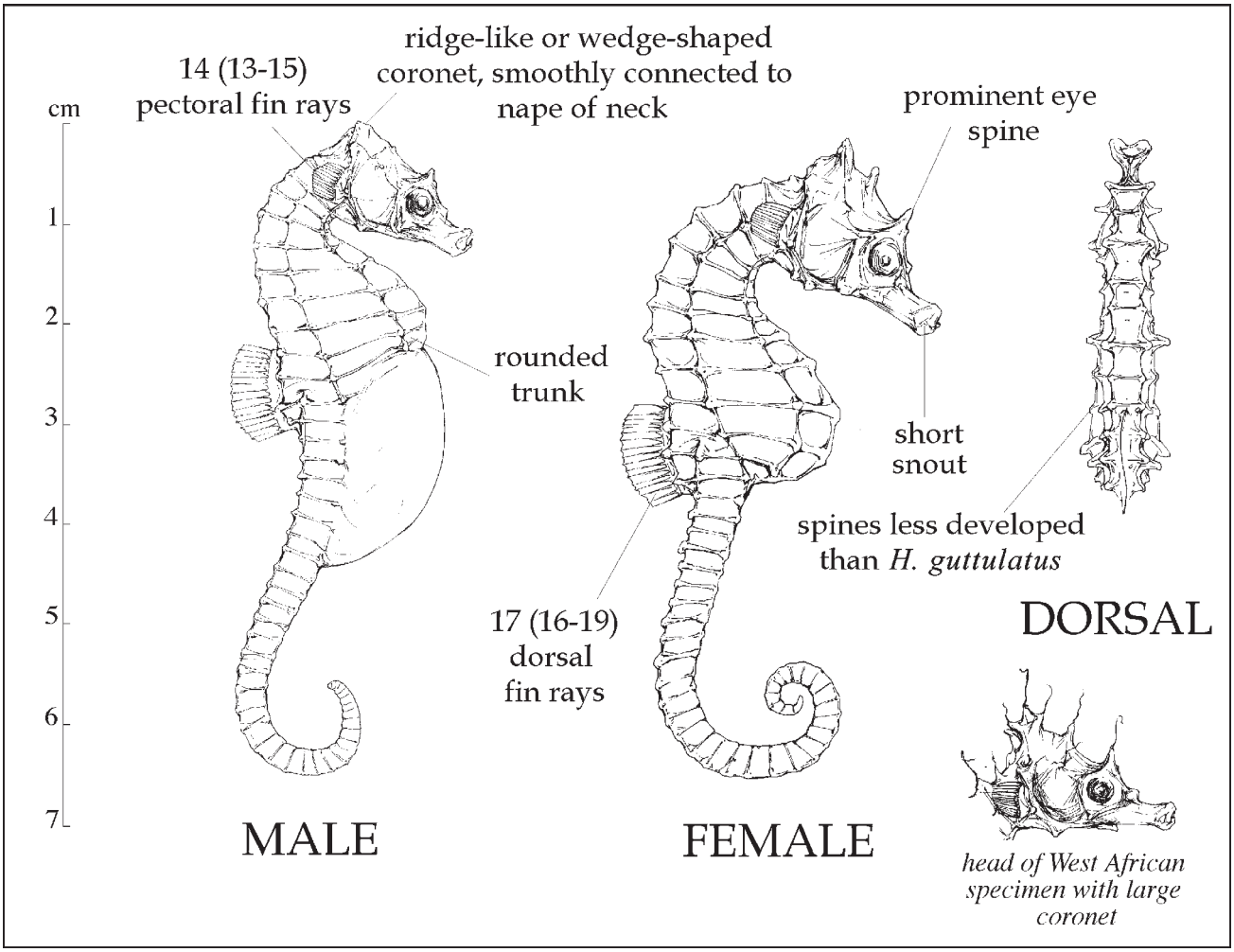
Similar species
- *H. algiricus* has thicker body rings and fewer dorsal fin rays
- *H. hippocampus* has a more rounded body, shorter snout, fewer fin rays, and a higher, ridge-like or wedge-shaped coronet attached smoothly to the nape of the neck

Other notes
- Males have proportionally longer tails than do females[77]
- This species has been widely called *H. ramulosus*, but re-examination of the *H. ramulosus* type specimen shows that it differs from the species discussed in this guide as *H. guttulatus*
- Specimens from the Black Sea have tiny coronets and less pronounced tubercles on the body. They may represent a separate species

Hippocampus hippocampus Linnaeus 1758

Common names
Short-snouted seahorse

Synonyms
H. heptagonus Rafinesque 1810; *H. antiquorum* Leach 1814; *H. vulgaris* Cloquet 1821; *H. brevirostris* Schinz 1822; *H. antiquus* Risso 1826; *H. europaeus* Ginsburg 1933



Description
Maximum recorded adult height: 15 cm[79]
Trunk rings: 11
Tail rings: 37 (35–38)
HL/SnL: 3.0 (2.8–3.4)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (16–19)
Pectoral fin rays: 14 (13–15)
Coronet: Narrow, ridge-like and joined smoothly to nape of neck, or wedge-shaped (narrow front and high, broad back); some specimens, especially from West Africa, have large angular coronet
Spines: Low (very low in adults)
Other characteristics: Short snout, usually less than one-third head length, and prominent eye spine

Colour/pattern: Brown, orange, purple or black, sometimes with tiny white dots (these do not coalesce into thick horizontal wavy lines as in *H. guttulatus*)

Confirmed distribution
Algeria; France; Greece; Guinea; Italy; Malta; Netherlands; Portugal; Senegal; Spain; United Kingdom of Great Britain and Northern Ireland.

Suspected distribution
Albania; Bosnia and Herzegovina; Belgium; Croatia; Cyprus; Egypt; Gambia; Guinea-Bissau; Israel; Lebanon; Libya; Mauritania; Monaco; Morocco; Serbia and Montenegro; Slovenia; Syria; Tunisia; Turkey; Western Sahara

Habitat
Maximum reported depth 60 m[82]; shallow, muddy waters, estuaries, inshore among algae, rocky areas, may over-winter in deeper water[76]

Life history
Height at which 50 percent of the population has reached sexual maturity 7.7 cm[77]; breeding season April to October[83]; found in pairs in the wild[77]; egg diameter averages 1.6 mm[84]; gestation duration averages 3.5 weeks[15]; length at birth averages 9.3 mm[15]; maximum reported brood size 865[81]; planktonic immediately after birth[81]

Trade
Dried for curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. hippocampus* is listed as Data Deficient by IUCN[13]. *H. hippocampus* is listed in the Red Data Book of Portugal; the species is protected in Slovenia under the 1993 Protection of Threatened Animals Act, which prohibits trade in and the keeping of the seahorse in captivity

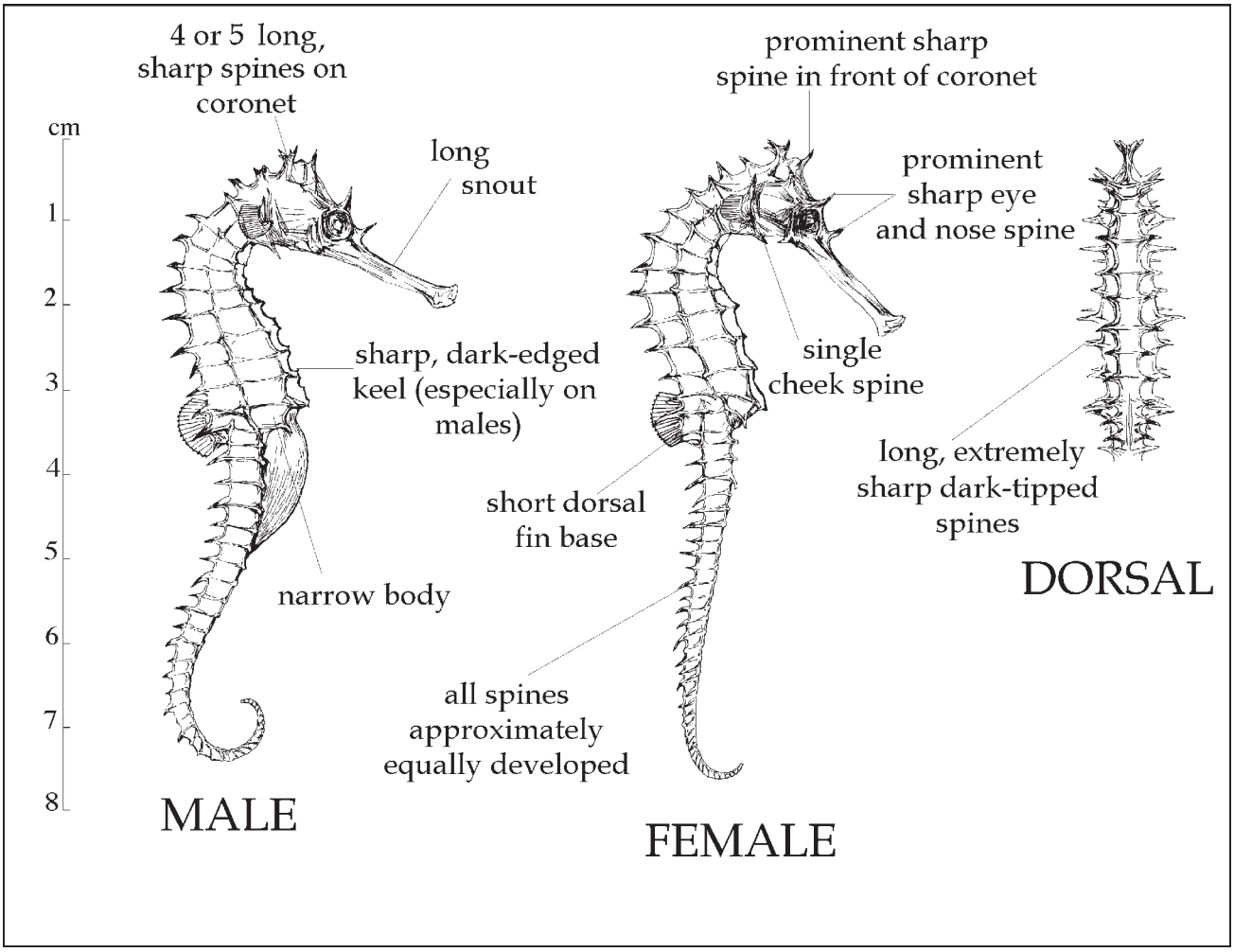
Similar species
- *H. erectus*, found in the western Atlantic, is larger and the young of the species usually have more prominent spines
- *H. guttulatus* is larger and has more fin rays, a small coronet with five rounded points or knobs that is not connected smoothly to the nape of the neck, and a long horizontal plate in front of the coronet. It usually has thick skin filaments on the head and dorsal upper trunk, and often has dark-edged white spots coalescing into wavy horizontal lines on the body

Other notes
- Some specimens from West Africa have large, angular coronets and may represent a separate species

Hippocampus histrix Kaup 1856

Common names
Thorny seahorse; *ibaratatsu* (Japanese; Japan); *stekel-seeperdjie* (Afrikaans;South Africa)

Synonyms
None known



Description
Maximum recorded adult height: 17 cm[68]
Trunk rings: 11
Tail rings: 35 (34–37)
HL/SnL: 1.8 (1.7–2.0)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (15–18)
Pectoral fin rays: 18 (17–20)
Coronet: Medium, with four or five long, sharp spines
Spines: Extremely long and sharp; all spines well-developed
Other distinctive characteristics: Long snout (more than one-half head length); single cheek spine; short dorsal fin base; always has at least as many pectoral as dorsal fin rays (most species have more dorsal than pectoral fin rays); sharp ventral keel; prominent spine in front of coronet

Colour/pattern: Base colour variable, including pale pink, yellow or green; spines often dark-tipped; may have pale saddles, often with small dark spots, across dorso-lateral surfaces; snout not striped

Confirmed distribution
China; Federated States of Micronesia; France (New Caledonia, Réunion, and Tahiti); India; Indonesia; Japan; Malaysia; Mauritius; Papua New Guinea; Philippines; Samoa; South Africa; Tonga; United Republic of Tanzania; United States of America of America (Hawaii); Viet Nam

Suspected distribution
Bangladesh; Brunei Darussalam; Cambodia; China (Hong Kong SAR and Province of Taiwan); Comoros; Fiji; Kenya; Kiribati; Madagascar; Mozambique; Myanmar; Nauru; Palau; Seychelles; Singapore; Solomon Islands; Sri Lanka; Thailand; Tuvalu; United States of America (American Samoa); Vanuatu

Habitat
Typically found >6 m depth[60]; maximum reported depth 20 m[85]; seagrass bed, weedy rocky reefs, sponges[85]; soft bottom with soft corals and sponges[4]

Life history
Found in pairs in the wild[85]

Trade
Dried for traditional medicine and curios; rarely live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. histrix* is listed as Data Deficient by IUCN[13]. Indian populations were moved under Schedule-I of the Wildlife Protection Act (1972) in 2001 which bans any collection or trade; *H. histrix* is listed as Vulnerable in the Viet Nam National Red Data Book

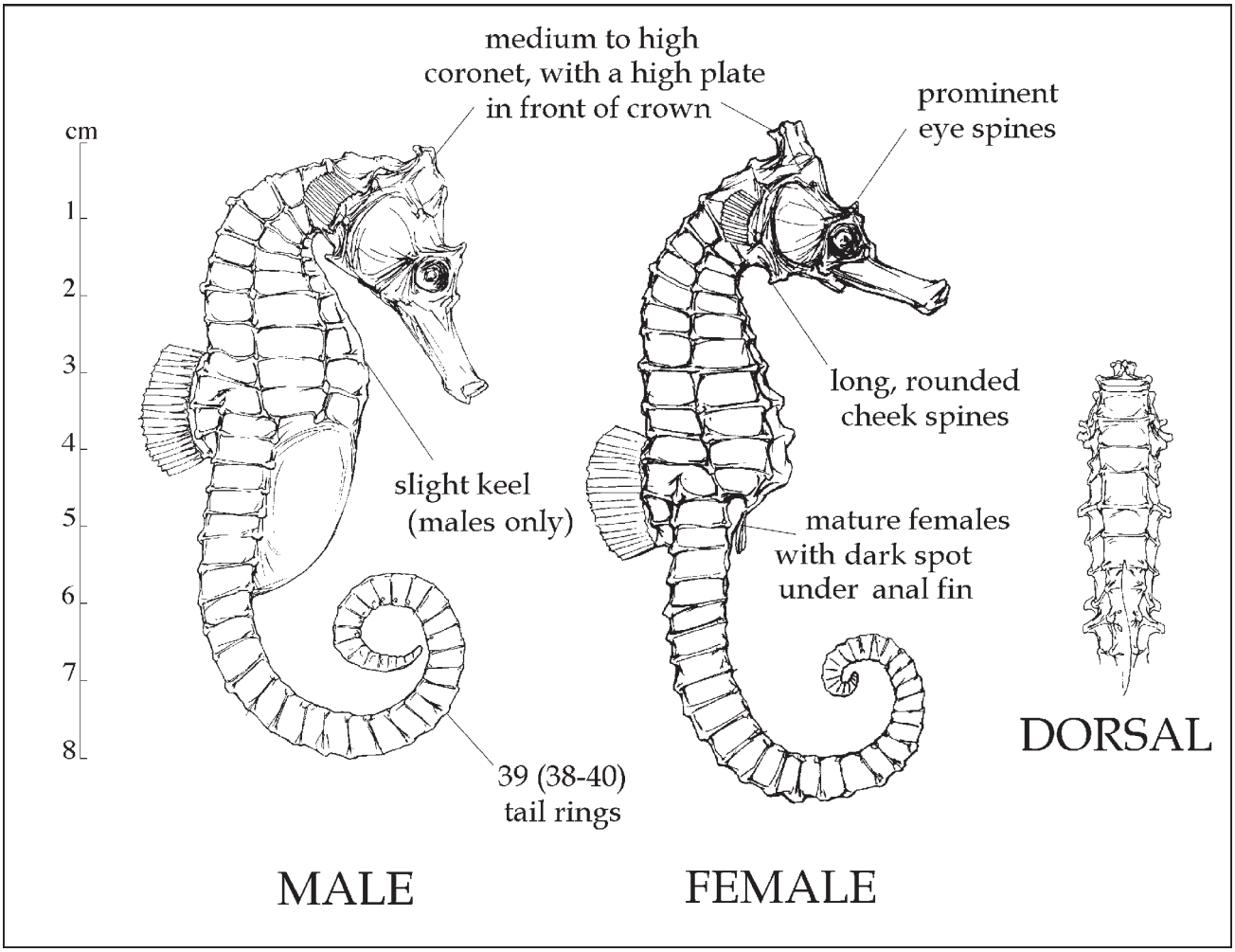
Similar species
- *H. angustus*, occurring off Australia, has a shorter, striped snout, double cheek spines, and blunter spines, especially on the upper dorsal surface of the trunk
- *H. barbouri* has a shorter, striped snout, a higher coronet, double cheek spines, and blunter spines. It often also has poorly developed or undeveloped spines on alternate tail rings
- *H. jayakari* has more tail rings, more dorsal fin rays, a shorter snout, and spines on alternate tail rings only. This species furthermore is not known outside the Red Sea and Persian Gulf
- *H. spinosissimu*s has a deeper body; more tail rings; a shorter snout; lower, blunter spines; and a higher coronet with smaller spines

Other notes
- The name *H. histrix* has been used indiscriminately for at least five species of spiny seahorse in the Indo-Pacific basin. The true *H. histrix* is a distinctive species with one of the largest distributions of any seahorse

Hippocampus ingens Girard 1859

Common names
Pacific seahorse (U.S.A.); *caballito del Pacifico* (Spanish, Mexico)

Synonyms
H. gracilis Gill 1862; *H. ecuadorensis* Fowler 1921; *H. hildebrandi* Ginsburg 1933



Description
Maximum recorded adult height: 31 cm[86]
Trunk rings: 11
Tail rings: 39 (38–40)
HL/SnL: 2.3 (2.1–2.5)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring.
Dorsal fin rays: 19 (18–21)
Pectoral fin rays: 16 (15–17)
Coronet: Medium-high, tilted backwards with five well-defined points, sharp edges, or flanges at top
Spines: Variable, from low, rounded bumps to well-developed, blunt-tipped spines
Other distinctive characteristics: Prominent, long (drooping), rounded, single cheek spines; prominent eye spine (may be broad or almost double); males commonly have a prominent keel; sexually mature females often have a dark patch below the anal fin[87]

Colour/pattern: Reddish-maroon, grey, yellow and gold; various shades of brown; may have fine white lines and dark markings running vertically down body

Confirmed distribution
Columbia; Costa Rica; Ecuador; El Salvador; Guatemala; Mexico; Nicaragua; Panama; Peru; United States of America

Suspected distribution
Honduras

Habitat
Typically found at 1–20 m depth[87]; maximum reported depth 60 m[87]; among gorgonians or black coral[88]; clinging to reefs on sponges, branches, and corals[4]; seagrass[89]; have been found in the stomachs of Pacific yellowfin tuna and bluefin tuna[19]

Life history
Maximum reported height at onset of sexual maturity 5.4 cm[89]; gestation duration 14–15 days[87]; length at birth averages 8.5 mm[15]; brood size usually 400[87]; maximum reported brood size 2000[23]

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. ingens* is listed as Vulnerable by IUCN[13]. Mexican populations are listed in the NOM-059-SEMARNAT-2001 as species subject to special protection; Mexico prohibits the intentional capture and trade of wild seahorses, permitting only the commercialisation of cultured and incidentally caught seahorse. *H. ingens* is subject also to bycatch in shrimp trawling and is affected by habitat degradation[90]

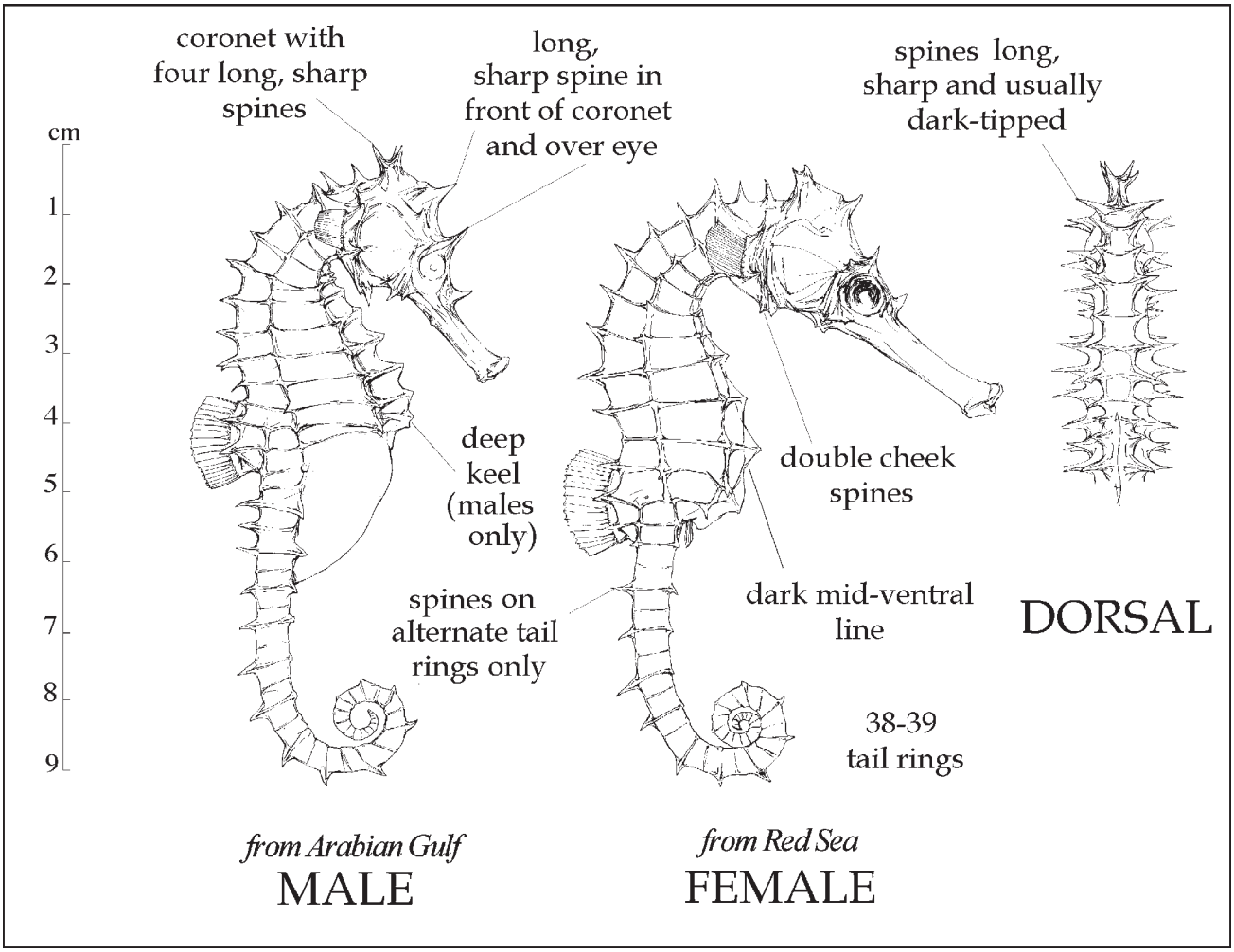
Similar species
- *H. algiricus* has fewer tail rings; broad, almost double eye and cheek spines; and usually fewer dorsal fin rays. The species is found only in West Africa
- *H. kelloggi* has fewer dorsal fin rays, more pectoral fin rays, and a narrower body. It is found only in the Indo-Pacific basin
- *H. kuda* usually has fewer tail rings and fewer dorsal fin rays, and may have 2 cheek spines and no eye spines. It is found only in the Indo-Pacific basin
- *H. reidi* has fewer tail rings and a lower coronet, but with a broader, more rounded top. The species is found only in the Caribbean

Other notes
- Genetic evidence suggests that *H. ingens* and *H. reidi* are closely related and are part of the *H. kuda* complex (see Appendix D)[40]

Hippocampus jayakari Boulenger 1900a

Common names
Jayakar's seahorse

Synonyms
None known



Description
Maximum recorded adult height: 14 cm[4]
Trunk rings: 11
Tail rings: 38–39
HL/SnL: 2.1 (1.9–2.4)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 19 (18–19)
Pectoral fin rays: 17–18
Coronet: Low-medium with four long sharp spines
Spines: Long and sharp; no spines on alternate tail rings
Other distinctive characteristics: Double cheek spine (usually); double spine below eye; long, sharp spine in front of coronet and above eye

Colour/pattern: Pale cream or beige coloured; often with a pattern of large white spots on body and face; spines with a broad dark band near tip; dark midventral line

Confirmed distribution
Israel; Oman; Pakistan

Suspected distribution
Bahrain; Djibouti; Egypt; Eritrea; Islamic Republic of Iran; Kuwait; Qatar; Saudi Arabia; Somalia; Sudan; United Arab Emirates; Yemen

Habitat
Maximum reported depth 20 m[4]; rubble-algae with sparse seagrass, soft-bottom on sponges[4]; seagrass beds[2]

Life history
Unknown

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. jayakari* is listed as Data Deficient by IUCN[13]

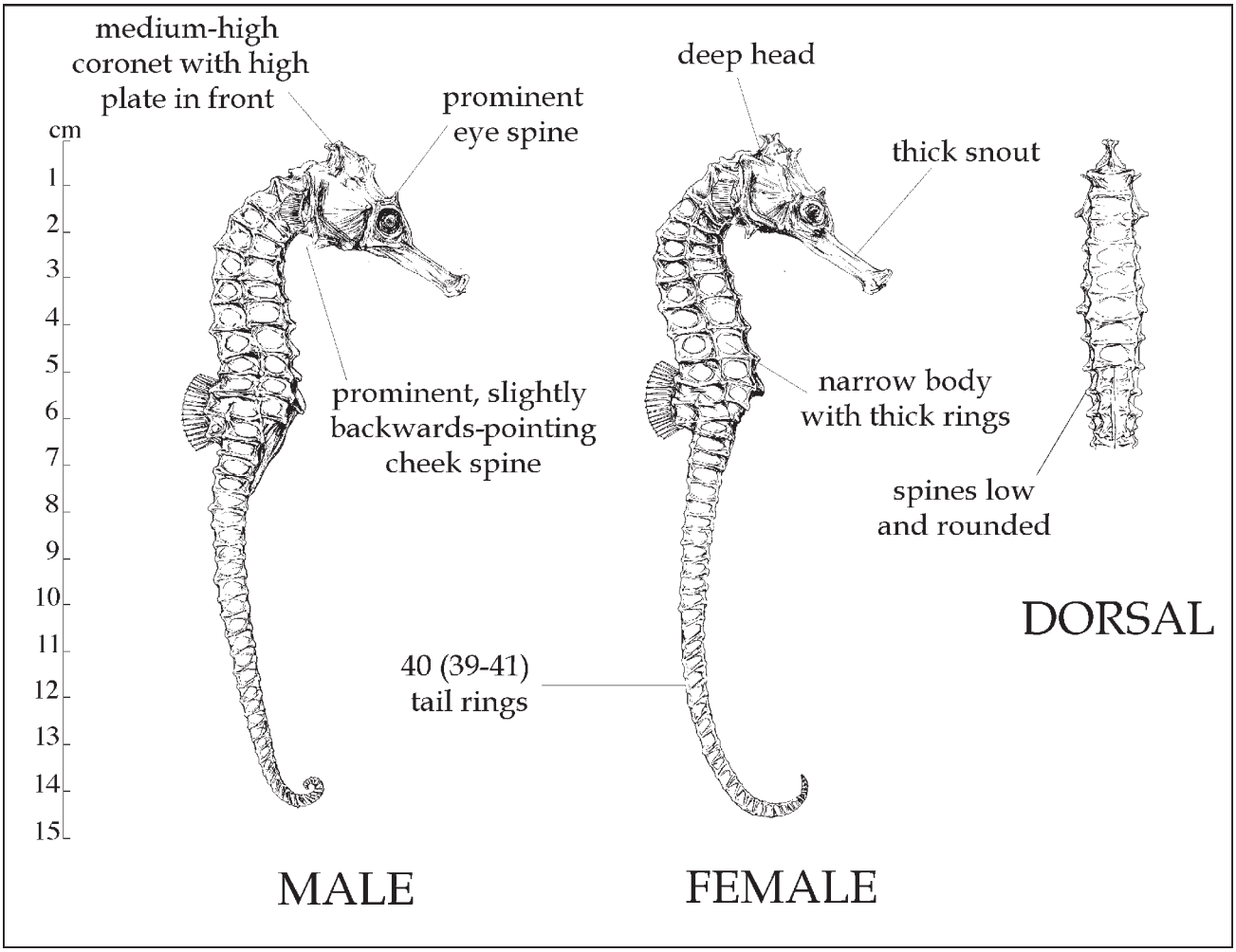
Similar species
- *H. histrix* has fewer tail rings, fewer dorsal fin rays, a longer snout, spines on all tail rings, and a single cheek spine

Other notes
- Red Sea specimens have much longer snouts than do those from the Arabian Sea
- Some specimens have extremely long, thick skin filaments attached to their head and neck; these can be lost and regenerated

Hippocampus kelloggi Jordan and Snyder 1902

Common names
Kellogg's seahorse; great seahorse (U.S.A.); offshore seahorse (Viet Nam); *o-umi-uma* (Japanese; Japan)

Synonyms
H. suezensis Duncker 1940 (but see Other notes)



Description
Maximum recorded adult height: 28 cm[4]
Trunk rings: 11
Tail rings: 40 (39–41)
HL/SnL: 2.1 (2.0–2.3)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18 (17–19)
Pectoral fin rays: 18 (17–19)
Coronet: High, with five short spines and high plate in front of coronet
Spines: Low and rounded; slightly better developed in younger specimens, but still blunt-tipped
Other distinctive characteristics: Long, slightly backwards-pointing, rounded cheek spine; deep head; narrow body; thick body rings; prominent, rounded eye spine; thick snout

Colour/pattern: Pale, often with tiny white spots running in vertical lines; otherwise uniform in colour

Confirmed distribution
China; India; Indonesia; Japan; Malaysia; Pakistan; Philippines; Thailand; United Republic of Tanzania; Viet Nam

Suspected distribution
Australia; Bahrain; Bangladesh; Brunei Darussalam; Cambodia; China (Hong Kong SAR and Province of Taiwan); Djibouti; Egypt; Eritrea; Iraq; Islamic Republic of Iran; Israel; Kenya; Kuwait; Myanmar; Oman; Qatar; Saudi Arabia; Seychelles; Singapore; Somalia; Sri Lanka; Sudan; United Arab Emirates; Yemen

Habitat
Maximum reported depth 152 m[60]; associated with gorgonian corals and sea whips[91]; soft bottom[4]

Life history
Unknown

Trade
Dried for traditional medicine and curios, live for aquarium and hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. kelloggi* is listed as Data Deficient by IUCN[13]. Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001; the species is listed under wildlife protection laws in China, where it is listed as a Priority Fish Species (Grade B) in a review of China's biodiversity[92]; Indian populations were moved under Schedule-I of the wildlife Protection Act (1972) in 2001 which bans any collection or trade; *H. kelloggi* is listed as Vulnerable in the Viet Nam National Red Data book (although the accompanying picture is of *H. trimaculatus*)

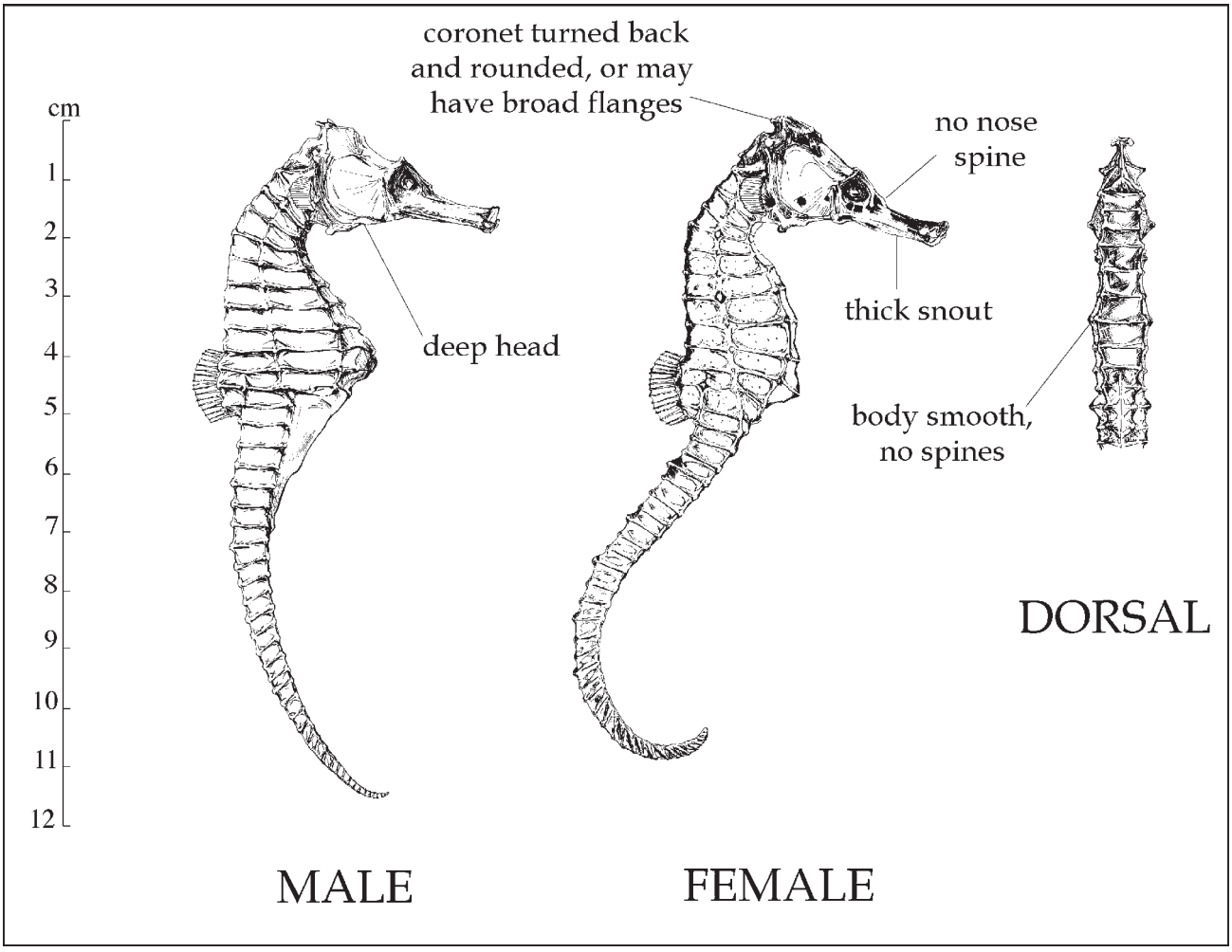
Similar species
- *H. algiricus*, found only in West Africa, has fewer tail rings and broad (almost double) eye and cheek spines
- *H. ingens*, found only off the west coast of the Americas, has fewer pectoral fin rays and more dorsal fin rays
- *H. kuda* has a deeper body, fewer tail rings, fewer pectoral fin rays, and a lower, more rounded coronet
- *H. spinosissimus* has a deeper body, fewer tail rings, and fewer pectoral fin rays. Young animals, however, look very similar to *H. kelloggi*

Other notes
- The name *H. suezensis* has been used for large seahorses from the Red Sea. The validity of this name has not yet been assessed

Hippocampus kuda Bleeker 1852a

Common names
Yellow seahorse; spotted seahorse

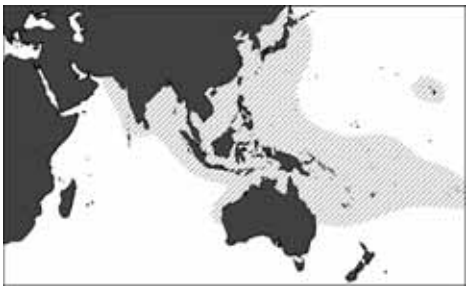
Synonyms
H. moluccensis Bleeker 1852b; *H. taeniopterus* Bleeker 1852b; *H. polytaenia* Bleeker 1854b; *H. melanospilos* Bleeker 1854c; *H. chinensis* Basilewsky 1855; *H. rhynchomacer* Duméril 1870; *H. tristis* Castelnau 1872; *H. aterrimus* Jordan and Snyder 1902; *H. hilonis* Jordan and Evermann 1903; *H. taeniops* Fowler 1904; *H. horai* Duncker 1926; *H. kuda multiannularis* Raj 1941; *H. novaehebudorum* Fowler 1944



Description
Maximum recorded adult height: 17 cm[2]
Trunk rings: 11
Tail rings: 36 (34–38)
HL/SnL: 2.3 (2.0–2.6)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (17–18)
Pectoral fin rays: 16 (15–18)
Coronet: Low to medium-height, rounded, overhanging at the back, often with a cup-like depression in the top; sometimes with broad flanges; not spiny
Spines: Low, rounded bumps only

Other distinctive characteristics: Deep head; deep body; thick snout
Colour/pattern: Often totally black with a grainy texture; alternatively pale yellow or cream with fairly large, dark spots (especially females); may be sandy coloured, blending in with surroundings

Confirmed distribution



Australia; Cambodia; China (Hong Kong SAR and Province of Taiwan); Fiji; France (New Caledonia and Tahiti); India; Indonesia; Japan; Malaysia; Pakistan; Papua New Guinea; Philippines; Federated States of Micronesia; Singapore; Solomon Islands; Thailand; Tonga; United States of America (Hawaii); Viet Nam

Suspected distribution
Bangladesh; Brunei Darussalam; China; Kiribati; Myanmar; Nauru; Palau; Samoa; Sri Lanka; Tuvalu; United States of America (American Samoa); Vanuatu

Habitat
Typically found at 0–8 m depth[60]; maximum reported depth 55 m[93]; coastal bays and lagoons, in seagrass and in floating weeds[85]; sandy sediments in rocky littoral zone[94]; macroalgae and seagrass beds[91]; branches, muddy bottoms[95]; mangroves, estuaries, harbours, lower reaches of rivers (can inhabit brackish waters)[4]

Life history
Breeding season year round[96]; egg diameter averages 1.8 mm[97]; gestation duration averages 17 days[15]; length at birth averages 7 mm[15]; maximum reported brood size 1405[96]

Trade
Dried for traditional medicines and curios; live for aquarium or hobbyist use

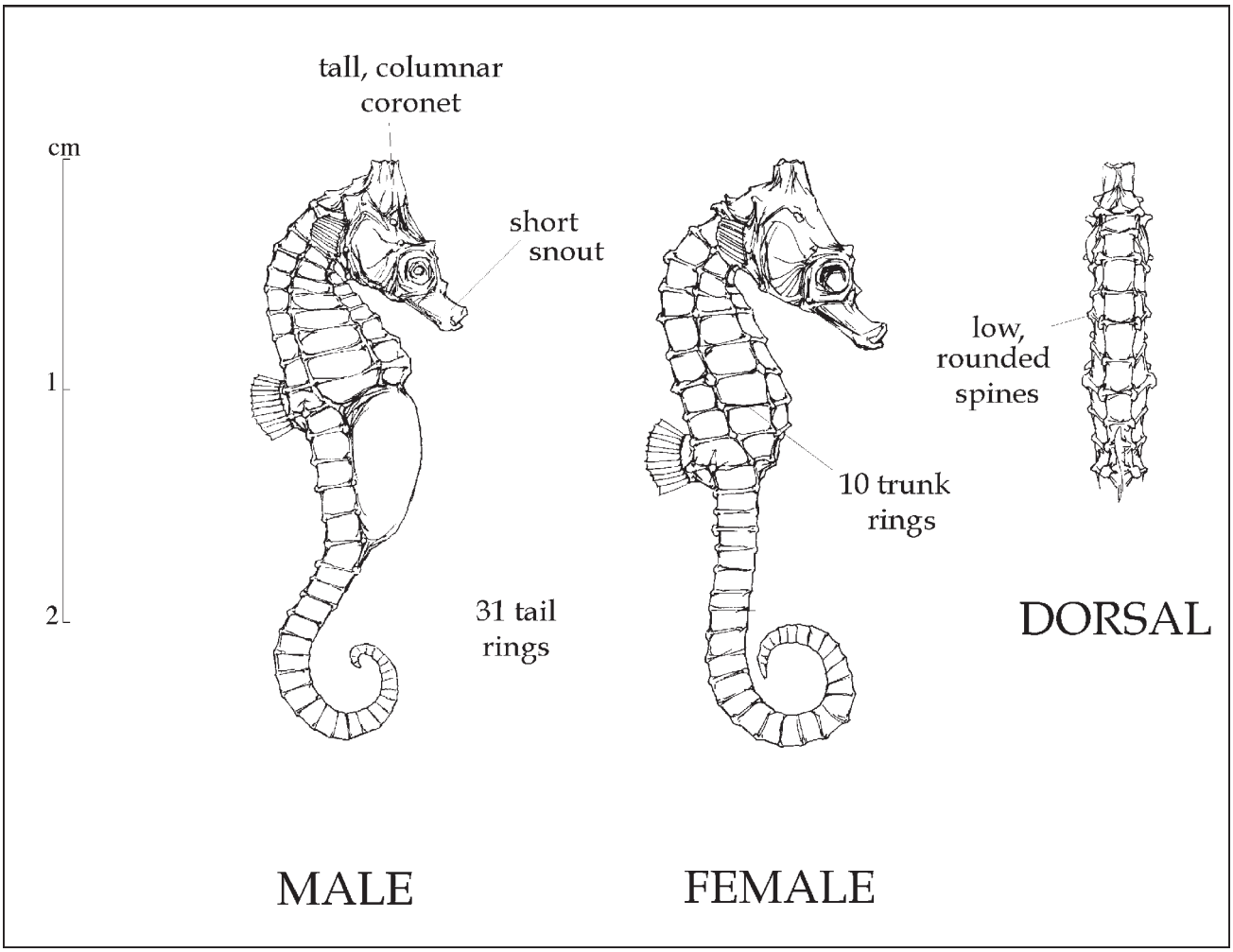
Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. kuda* is listed as Vulnerable by IUCN[13]. Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001; Indian populations were moved under Schedule-I of the wildlife Protection Act (1972) in 2001 which bans any collection or trade; the species is listed as Vulnerable in the Viet Nam National Red Data book

Similar species
- *H. algiricus*, found in the eastern Atlantic off the west coast of Africa, has broad, almost double eye and cheek spines
- *H. ingens*, found only off the west coast of the Americas, usually has more tail rings and more dorsal fin rays; never has 2 cheek spines
- *H. kelloggi* has a narrower body, more tail rings, a higher coronet, and more prominent spines
- *H. reidi*, found only in the western Atlantic, has fewer tail rings, a larger coronet, and broad, almost double eye spines
- The *H. kuda* complex (see Appendix D) warrants further research to clarify relationships among the species it encompasses

Hippocampus lichtensteinii Kaup 1856

Common names
Lichtenstein's seahorse (English)

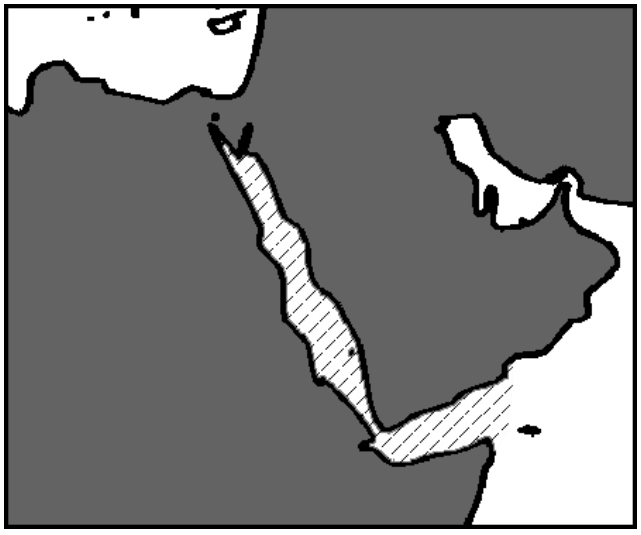
Synonyms
None known



Description
Maximum recorded adult height: 4 cm^2
Trunk rings: 10
Tail rings: 31
HL/SnL: 3.9–4.2
Rings supporting dorsal fin: 2 trunk rings (no tail rings)
Dorsal fin rays: 11–12
Pectoral fin rays: 11–12
Coronet: High, columnar or knob-like, without spines
Spines: Low, rounded bumps only
Other distinctive characteristics: Large head in relation to body
Colour/pattern: Preserved specimens pale brown without markings

Confirmed distribution
Red Sea (countries not known)

Suspected distribution
Djibouti; Egypt; Eritrea; Israel; Saudi Arabia; Somalia; Sudan; Yemen



Habitat
Unknown

Life history
Unknown

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. lichtensteinii* is listed as Data Deficient by IUCN[13]

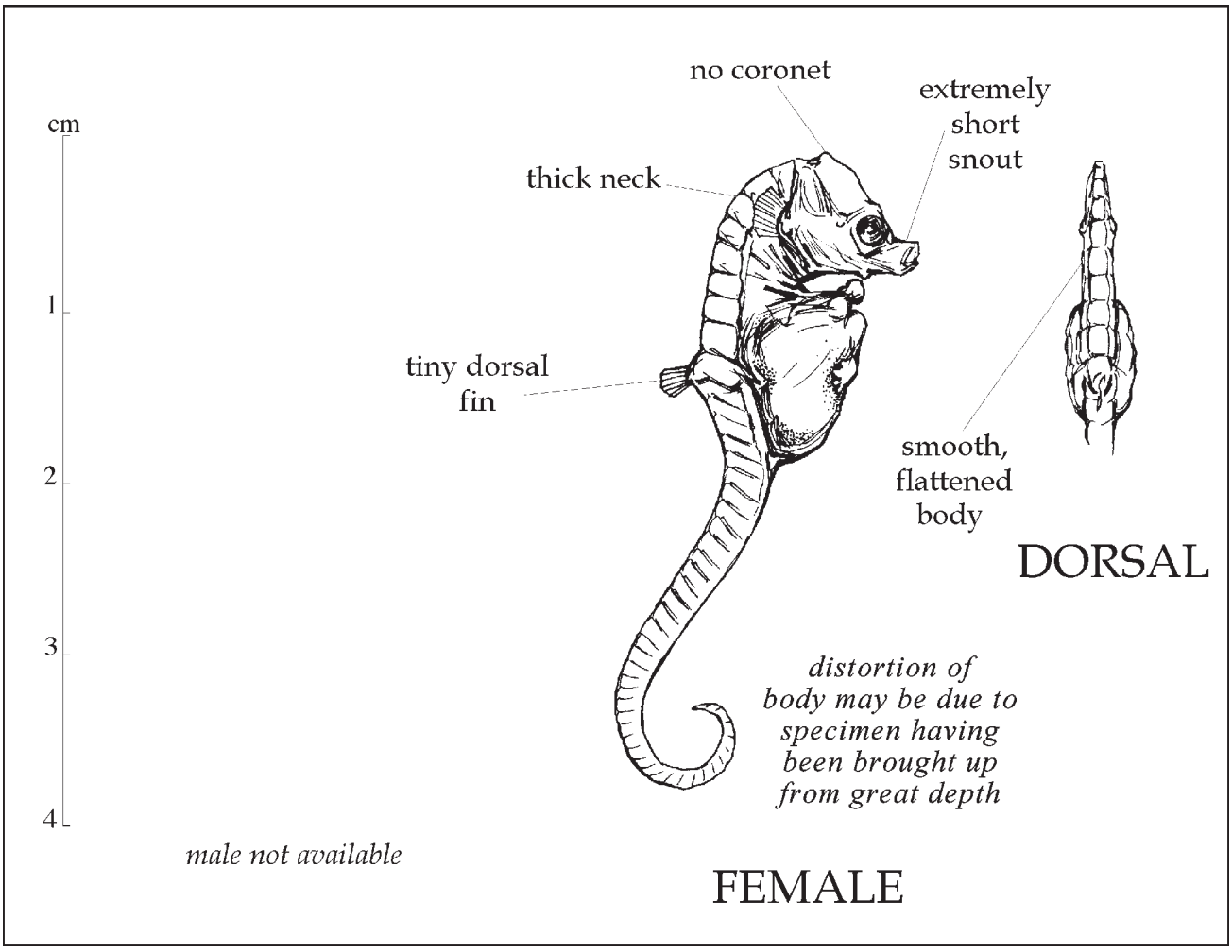
Similar species
- *H. zosterae* is found in the Caribbean, Gulf of Mexico and off the coasts of Florida and eastern Mexico

Other notes
- The origin of the type specimens is not known, but presumed by Kaup in his original description to be the Red Sea

Hippocampus minotaur Gomon 1997

Common names
Bullneck seahorse (Australia)

Synonyms
None known



Description
Maximum recorded adult height: Less than 5 cm[2]
Trunk rings: 8
Tail rings: 41
HL/SnL: 6.2
Rings supporting dorsal fin: 1 trunk ring and 1 tail ring
Dorsal fin rays: 7
Pectoral fin rays: 11
Coronet: Low mound
Spines: None — body totally flat
Other distinctive characteristics: No significant constriction between head and body; short snout; huge head; head and body extremely fleshy and lacking recognisable body rings, spines or other ornamentation; ventral trunk ridges undeveloped; body laterally flattened

Colour/pattern: Preserved specimens only have been examined thus far; they are mostly cream, with scattered brown-centred dots

Confirmed distribution
Australia

Suspected distribution
No other locations suspected

Habitat
Trawled from depths of 64–100 m[45]; fine, sandy or hard bottom, possibly in association with gorgonian coral[45]

Life history
Unknown

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. minotaur* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. minotaur* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001

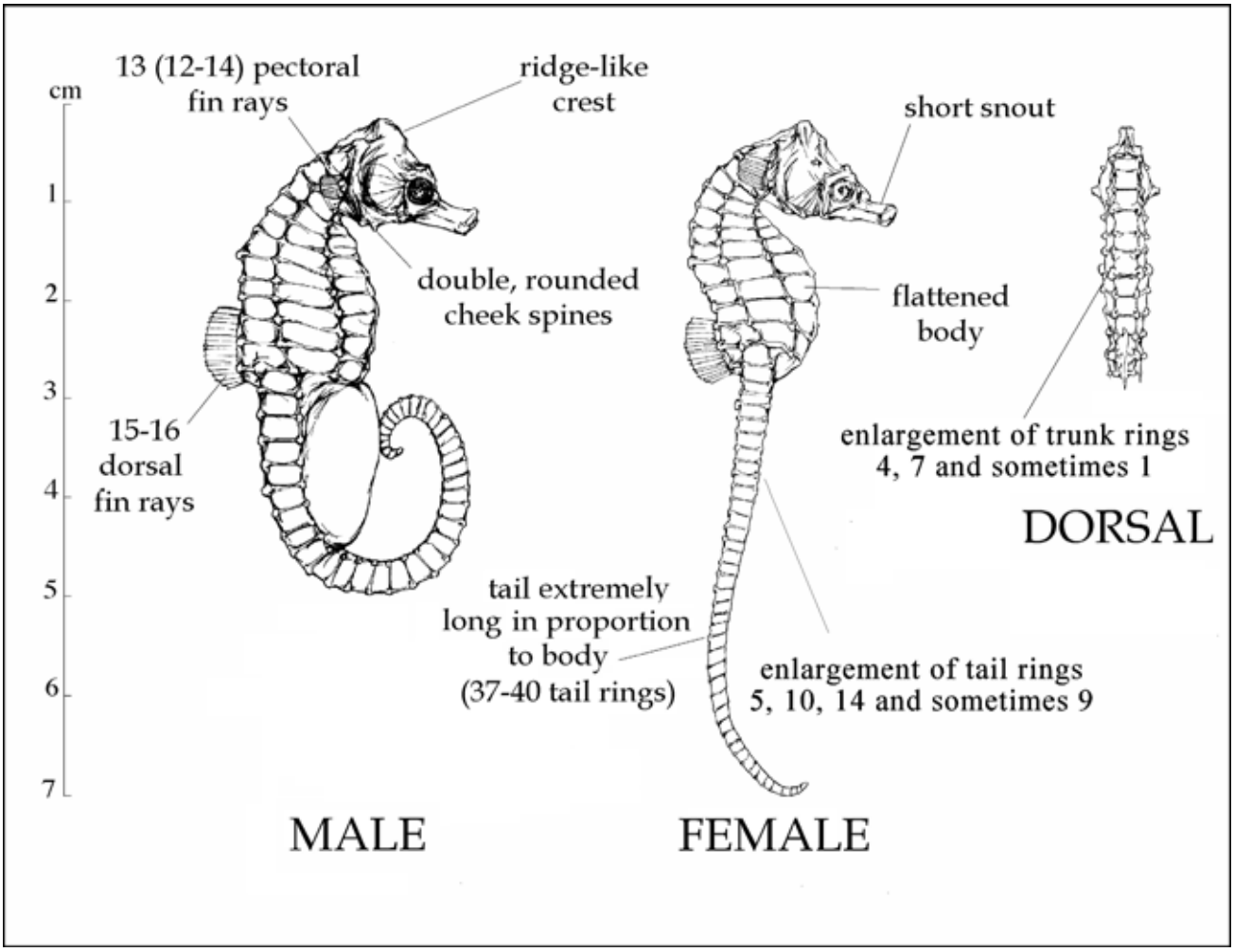
Similar species
- *H. bargibanti* has prominent tubercles on body, is less flattened, and has a larger dorsal fin base, more trunk rings, and fewer tail rings
- *H. denise* is less flattened and has a proportionately larger dorsal fin, a longer dorsal fin base, more trunk rings, and fewer tail rings

Other notes
- This species is known only from three type specimens (two females and a juvenile)

Hippocampus mohnikei Bleeker 1854a

Common names
Japanese seahorse; *kitano-umi-uma* and *sangotatsu* (Japanese; Japan)

Synonyms
H. japonicus Kaup 1856



Description
Maximum recorded adult height: 8 cm^2
Trunk rings: 11
Tail rings: 38 (37–40)
HL/SnL: 3.0 (2.8–3.9)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 15–16
Pectoral fin rays: 13 (12–14)
Coronet: Low, ridge-like crest
Spines: Low, body appears laterally flattened
Other distinctive characteristics: Double rounded cheek spines and double rounded spines below eye; tail extremely long in proportion to body; slight enlargement of 4^{th} 7^{th} and sometimes 1^{st} trunk

rings; slight enlargement of 5th, 10th, 14th and sometimes 9th tail rings
Colour/pattern: Usually dark brown all over, but may be mottled

Confirmed distribution
Japan

Suspected distribution
Cambodia; China; Thailand; Viet Nam

Habitat
Zostera seagrass beds in inlet water[68]; estuaries in Viet Nam[98]

Life history
Maximum reported height at onset of sexual maturity 5.5 cm[99]

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1].
H. mohnikei is listed as Vulnerable by IUCN[13].
H. mohnikei is listed (as *H. japonicus*) as Vulnerable in the 1994 Viet Nam Red Data Book

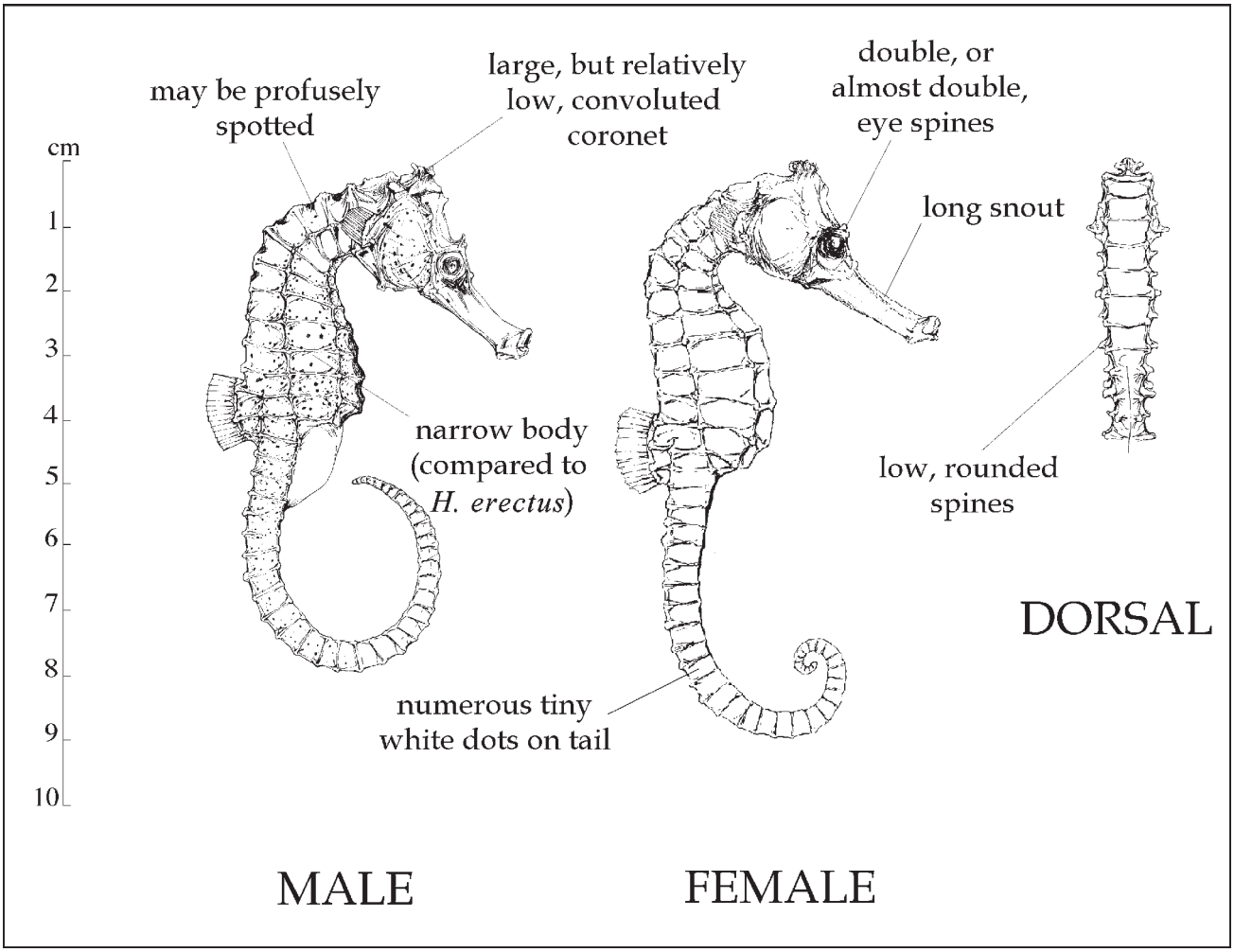
Similar species
- *H. coronatus* has a high coronet and greatly expanded spines bordering a short dorsal fin
- *H. sindonis* has fewer tail rings, 10 trunk rings, and a more prominent coronet

Other notes
- Specimens from Viet Nam are genetically distinct from those from Japan, but further genetic and morphological research is needed to confirm whether they represent separate species[40]

Hippocampus reidi Ginsburg 1933

Common names
Slender seahorse; longsnout seahorse (U.S.A.); *caballito de hocico* (Spanish, Mexico)

Synonyms
H. obtusus Ginsburg 1933; *H. poeyi* Howell Rivero 1934



Description
Maximum recorded adult height: 17.5 cm[2]
Trunk rings: 11
Tail rings: 35 (31–39)
HL/SnL: 2.2 (2.0–2.5)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17 (16–19)
Pectoral fin rays: 16 (15–17)
Coronet: Low to medium-height, rounded; may be large and convoluted (like crumpled paper)
Spines: None, or low, rounded tubercles
Other distinctive characteristics: Broad, almost double cheek and eye spines; long, thick snout; narrow body; usually no skin appendages
Colour/pattern: Often profusely spotted with brown dots and numerous tiny white dots (especially on tail); may have paler saddles across dorso-lateral surfaces

Confirmed distribution
Bahamas; Barbados; Belize; Brazil; Columbia; Cuba; Grenada; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; United Kingdom of Great Britain and Northern Ireland (Caribbean territories); United States of America; Venezuela

Suspected distribution
Antigua and Barbuda; Costa Rica; Dominica; Dominican Republic; France (Caribbean territories); France (French Guiana); Guatemala; Guyana; Netherlands (Caribbean territories); Saint Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Suriname; Trinidad and Tobago; United States of America (Caribbean territories)

Habitat
Typically found at 15–55 m depth[18]; mangrove roots, seagrass, macro algae, oysters, cnidarians, sponges, tunicates, artificial structures in estuaries[100]; gorgonian coral[69]; some on stone coral[101]

Life history
Maximum reported height at onset of sexual maturity 8 cm[18]; found in pairs in the wild[101]; egg diameter averages 1.2 mm[26]; length at birth averages 7 mm[26]; maximum reported brood size 1572[26]

Trade
Dried for curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. reidi* is listed as Data Deficient by IUCN[13]. Mexican populations are listed in the NOM-059-SEMARNAT-2001 as species subject to special protection; Mexico prohibits the intentional capture and trade of wild seahorses, permitting only the commercialisation of cultured and incidentally caught seahorses

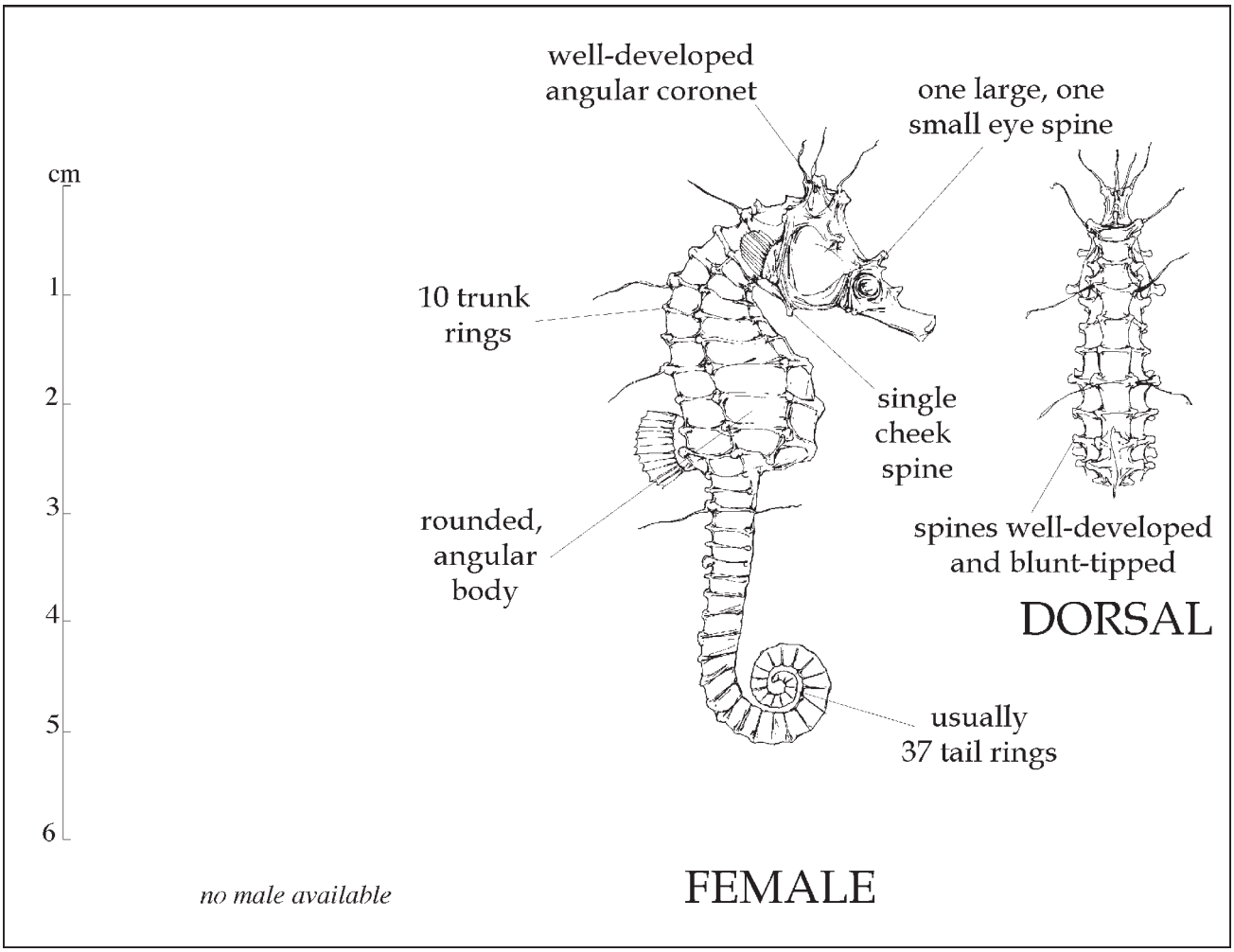
Similar species
- *H. algiricus* is found off West Africa
- *H. erectus* has a deeper body; white lines on the head and neck; and a wedge-like or triangular coronet, with sharp edges or spines
- *H. kuda* is found in the Indo-Pacific basin

Other notes
- Males have longer tails than do females[26]

Hippocampus sindonis Jordan and Snyder 1902

Common names
Shiho's seahorse; *enshûtatsu* (Japanese; Japan)

Synonyms
None known



Description
Maximum recorded adult height: 8 cm^2
Trunk rings: 10
Tail rings: 37 (36–38)
HL/SnL: 3.0 (2.8–3.3)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 12 (11–15)
Pectoral fin rays: 12 (12–14)
Coronet: Medium height, well-developed, angular
Spines: Well-developed, blunt-tipped, irregular
Other distinctive characteristics: Angular deep body; slight keel; prominent double eye spine (front spine shorter than back one); prominent, round-tipped single cheek spine
Colour/pattern: May be mottled

Confirmed distribution
Japan

Suspected distribution
No other locations suspected

Habitat
Unknown

Life history
Unknown

Trade
Not known in international trade

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. sindonis* is listed as Data Deficient by IUCN[13]

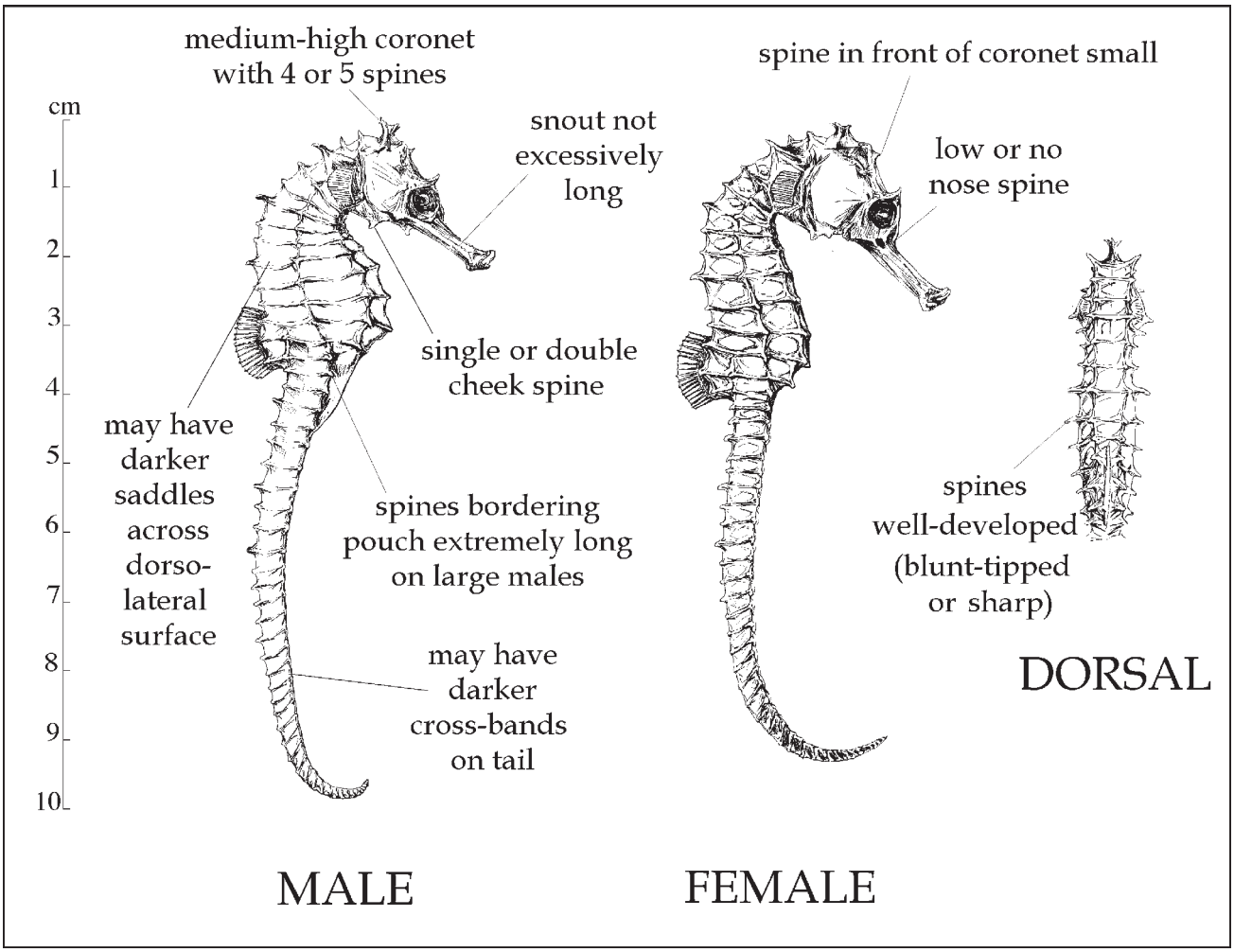
Similar species
- *H. coronatus* has more tail rings; a higher and narrower coronet, turned back at the top; and wing-like projections bordering the dorsal fin base
- *H. mohnikei* has 11 trunk rings and more tail rings; a relatively smooth body; double (low) cheek spines; and a coronet not significantly raised above the arch of the neck

Other notes
- This species has often been misidentified as *H. coronatus* or *H. mohnikei*

Hippocampus spinosissimus Weber 1913

Common names
Hedgehog seahorse

Synonyms
H. aimei (*arnei*) Roulé 1916 (but only one of the specimens he described)

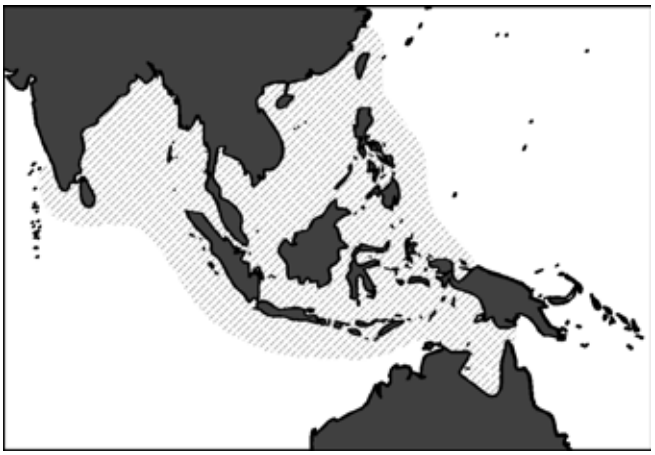


Description
Maximum recorded adult height: 17.2 cm[95]
Trunk rings: 11
Tail rings: 36 (33–39)
HL/SnL: 2.2 (2.0–2.4)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17–18 (16–20)
Pectoral fin rays: 17 (16–19)
Coronet: Low to medium-height, with four or five sharp spines
Spines: Well-developed, either blunt or sharp, usually longer on first, fourth, seventh and eleventh trunk rings and with a regular series of longer spines on tail
Other characteristics: Single or double cheek spines; small or no nose spine; spine in front of coronet rather undeveloped. Males have strongly developed, blunt-tipped spines bordering the pouch

Colour/pattern: Variable; plain or pale with darker saddles across dorso-lateral surface and with darker cross-bands on tail

Confirmed distribution
Australia; Cambodia; China (Province of Taiwan); Indonesia; Malaysia; Myanmar; Philippines; Singapore; Sri Lanka; Thailand; Viet Nam

Suspected distribution
Bangladesh; Brunei Darussalam; China; China (Hong Kong SAR); India; Papua New Guinea



Habitat
Typically found at >8 m depth[60]; maximum reported depth 70 m[102]; octocorals, macro algae, not hard corals, sand but not mud[91]; near coral reefs on sandy bottoms[95]

Life history
Maximum reported height at onset of sexual maturity 10.4 cm[95]; breeding season year round, peaking May to October[103]; maximum reported brood size 683[95]

Trade
Dried for traditional medicine and curios; live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. spinosissimus* listed as Vulnerable by IUCN[13]. Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001. Indian populations were placed under Schedule-I of the Wildlife Protection Act (1972) in 2001 which bans any collection or trade; commonly caught as bycatch by trawlers in Thailand; conservation of the species is threatened by damage to its habitats[104]

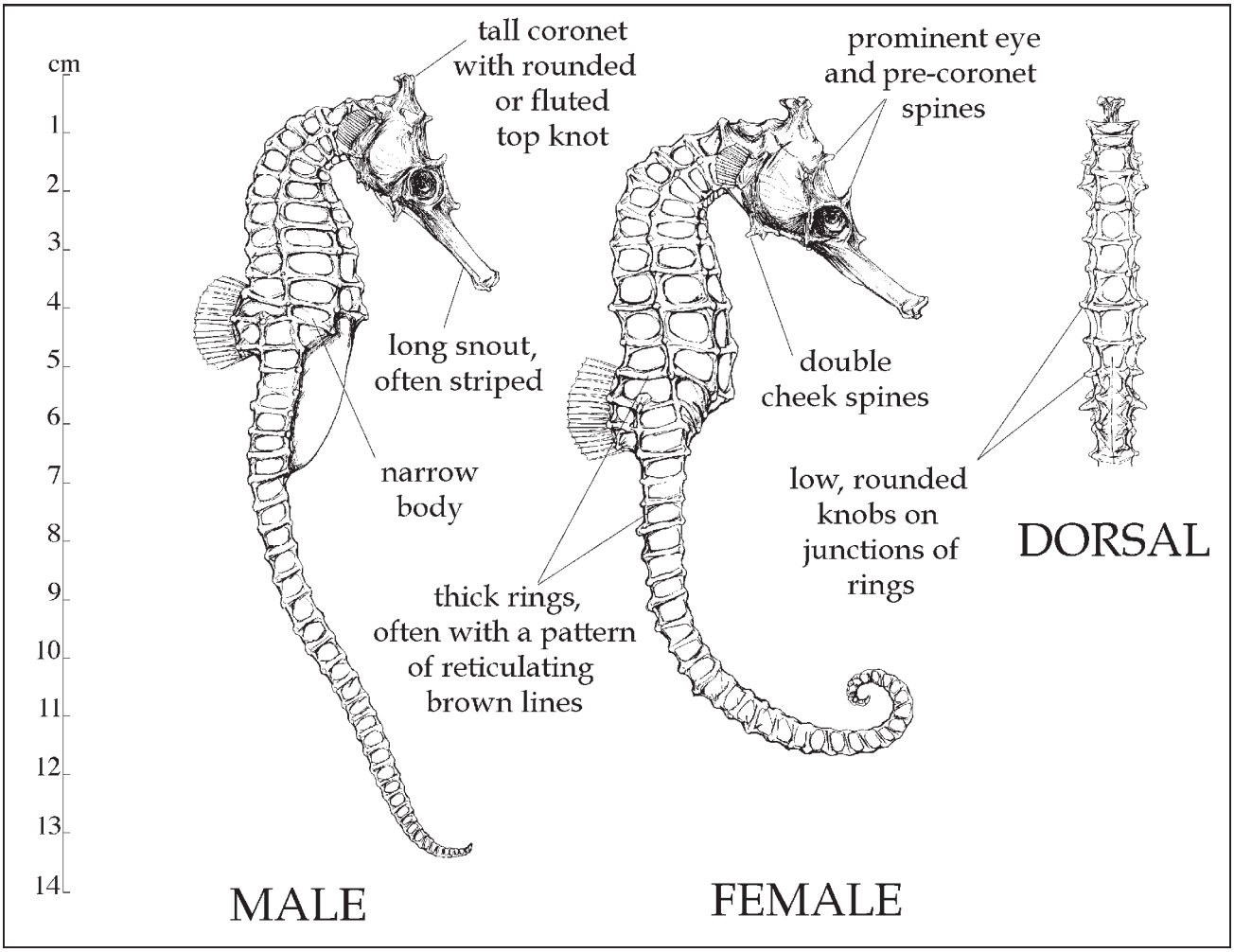
Similar species
- *H. barbouri* has double cheek spines, a striped snout, more fin rays, and fewer tail rings
- *H. histrix* has a much longer and thinner snout, longer and sharper spines, a shorter dorsal fin base, and fewer tail rings; cheek spine is always single

Other notes
- This species has often been misidentified as *H. histrix*

Hippocampus subelongatus Castelnau 1873

Common names
West Australian seahorse (Australia); tigersnout seahorse (U.S.A.)

Synonyms
H. elongatus Castelnau 1873



Description
Maximum recorded adult height: 20 cm[2]
Trunk rings: 11
Tail rings: 34 (33–36)
HL/SnL: 2.1 (1.9–2.3)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18 (16–20)
Pectoral fin rays: 17 (16–18)
Coronet: High to very high, with an expanded rounded top (larger and fluted in females; smaller and more rounded in males)
Spines: Low, rounded bumps only
Other distinctive characteristics: Thick rings; narrow body; usually double, rounded cheek spines; long snout (about one-half head length); prominent rounded eye spine

Colour/pattern: Usually pale with netlike pattern of reticulating brown lines over body and tail; may be yellow, orange, black, purple, white, cream or pink; brown ring around spines; striped snout; dark vertical line edging either side of dorsal surface of trunk

Confirmed distribution
Australia

Suspected distribution
No other locations suspected

Habitat
Typically found at 1–25 m depth[105]; found in deeper waters in winter[105]; found on edge of rocky areas, muddy bottoms and areas of high sediment load, jetty piles and moorings, often associated with sponges or sea squirts or attached to man-made objects[105]; rocky reef, seagrass meadow[106]

Life history
Breeding seasonal[107]; gestation duration 2–3 weeks[105]; length at birth averages 11 mm[15]; brood size usually 250–600[105]; maximum reported brood size 700[107]

Trade
Live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. subelongatus* is listed as Data Deficient by IUCN[13]. Management of the Australian populations of this species was placed under the Environment Protection and Biodiversity Conservation Act in 2001; numbers reportedly declined substantially in the Swan River near Perth, purportedly due to over-collecting for aquaria[105]

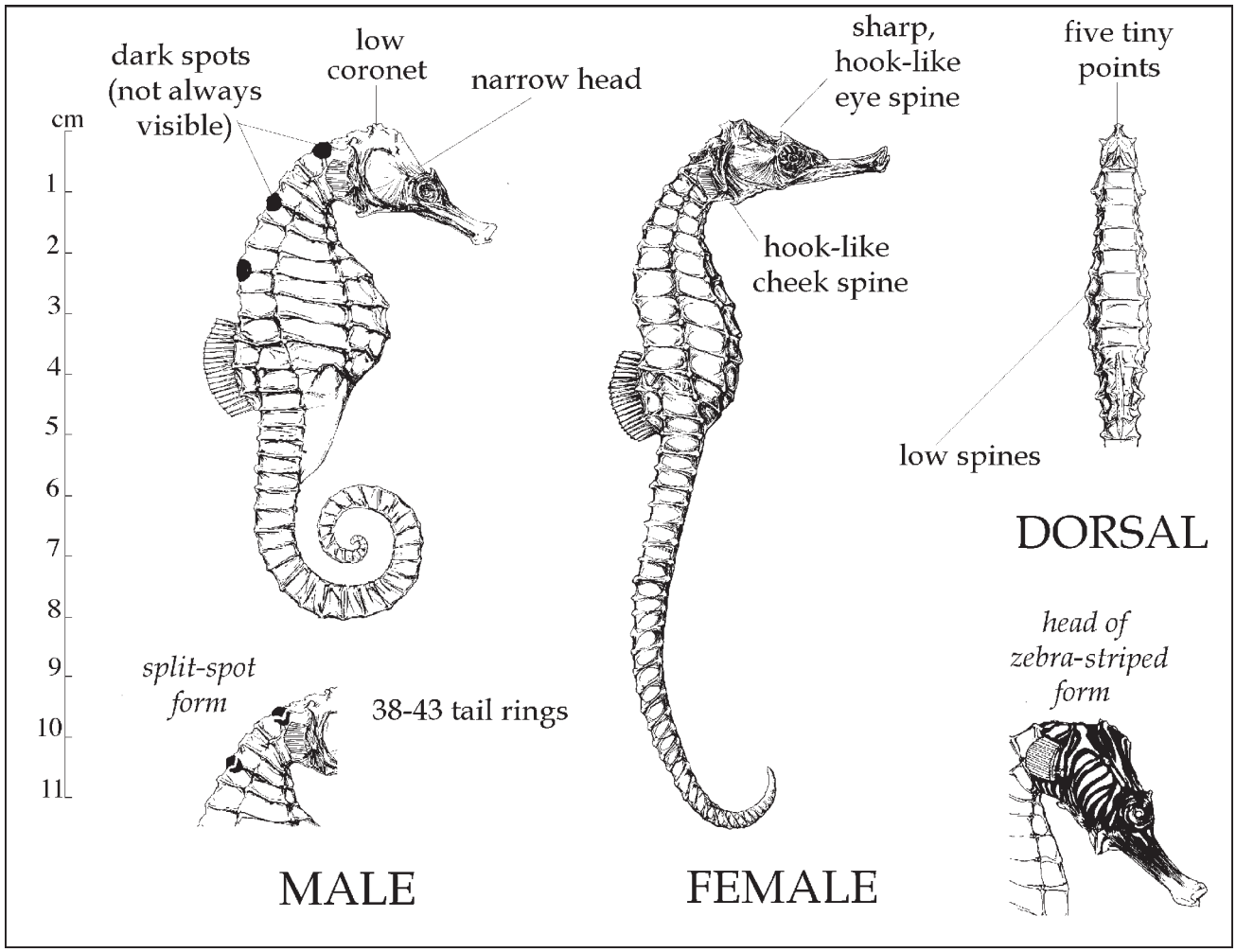
Similar species
- *H. angustus* has a lower coronet with distinct spines and spines on junctions of body ridges; found from Shark Bay northwards

Other notes
- Males have longer tails than do females[107]

Hippocampus trimaculatus Leach 1814

Common names
Three-spot seahorse; *takakura-tatsu* (Japanese; Japan); low-crowned seahorse and flat-faced seahorse (Australia)

Synonyms
H. mannulus Cantor 1850; *H. kampylotrachelos* Bleeker 1854d; *H. manadensis* Bleeker 1856; *H. planifrons* Peters 1877; *H. dahli* Ogilby 1908; *H. takakurae* Tanaka 1916



Description
Maximum recorded adult height: 17 cm[68]
Trunk rings: 11
Tail rings: 40–41 (38–43)
HL/SnL: 2.2 (1.9–2.4)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 20 (18–22)
Pectoral fin rays: 17–18 (16–19)
Coronet: Low, in line with arch of neck, visible as five tiny points
Spines: Low and small, to slightly raised
Other characteristics: Sharp, hook-like cheek, eye spines (appear flat); narrow head; no nose spine

Colour/pattern: Golden orange, sandy coloured or totally black; may have large dark spots on the dorso-lateral surface of the first, fourth and seventh trunk rings (less visible in dark specimens, and more common in males than females); some specimens zebra-striped in brown and white

Confirmed distribution

Australia; Cambodia; China (Hong Kong SAR and Province of Taiwan); France (Tahiti); India; Indonesia; Japan; Malaysia; Myanmar; Philippines; Singapore; Thailand; Viet Nam

Suspected distribution

Bangladesh; Brunei Darussalam; China; Papua New Guinea; Sri Lanka

Habitat

Typically found at >10 m depth[60]; maximum reported depth 100 m[108]; octocorals, macro algae, not hard corals[91]; gravel, sandy bottoms around shallow reefs[68]; muddy bottoms in deeper waters[95]

Life history

Breeding season year round, peaking March to May and in October[103]; egg diameter averages 1 mm[109]; gestation duration averages 16 days[15]; length at birth averages 6 mm[109]; maximum reported brood size 1783[95]

Trade

Dried for traditional medicine and curios

Conservation status

The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. trimaculatus* is listed as Vulnerable by IUCN[13]. Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001; Indian populations were placed under Schedule-I of the Wildlife Protection Act (1972) in 2001 which bans any collection or trade; listed as Vulnerable in the Viet Nam National Red Data book

Similar species

- *H. fisheri*, a smaller species found in Hawaii, has double cheek and eye spines, a prominent nose spine, and a hooked spine in front of the coronet; some body spines are greatly enlarged; and it has fewer tail rings and fin rays
- *H. zebra* has no cheek spine, fewer tail rings, fewer dorsal fin rays, and a higher coronet

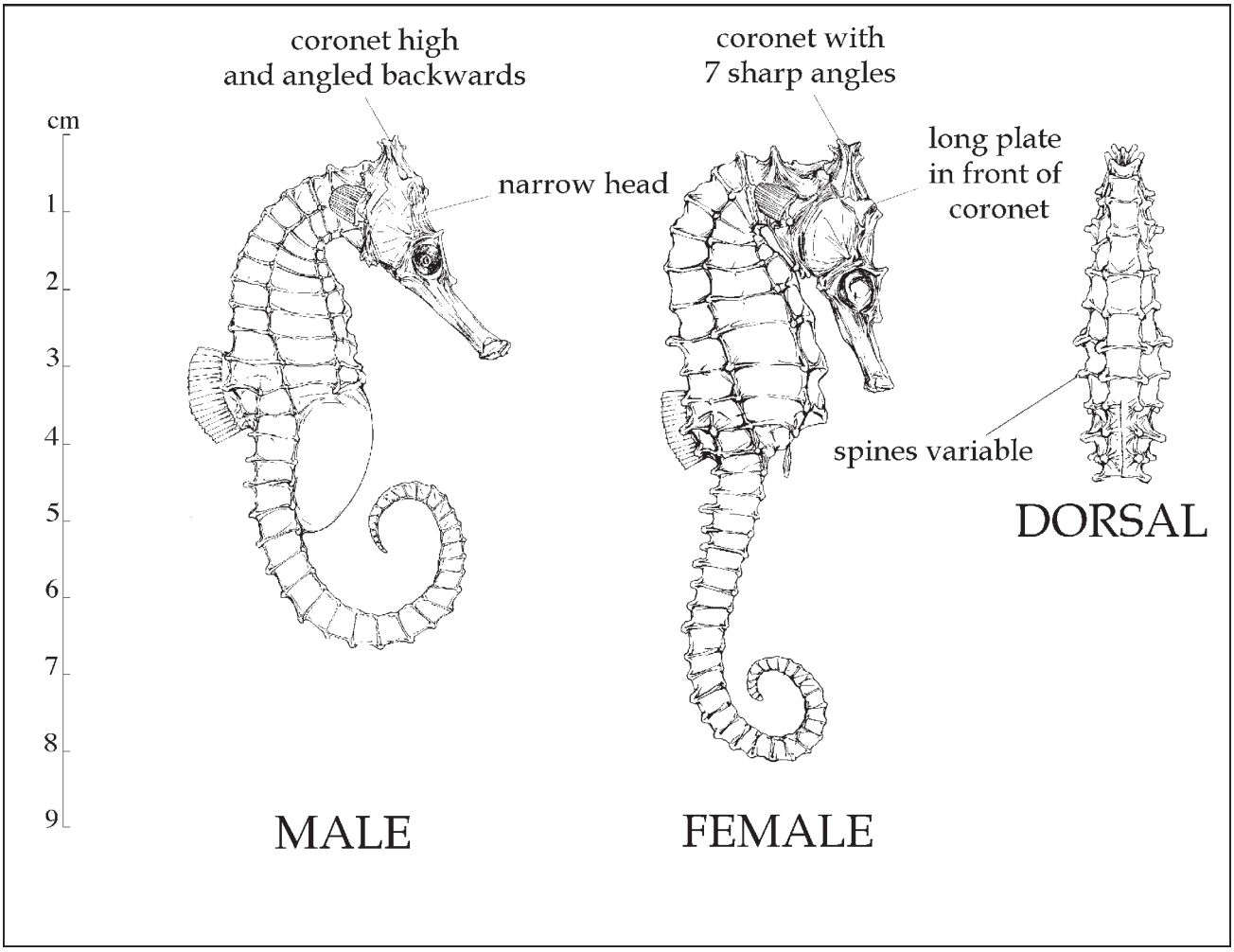
Other notes

- Some specimens from northwest Australia have shorter snouts (HL/SnL ratio of 2.3–2.7), deeper heads and bodies, usually 23 dorsal fin rays, small cheek and eye spines (not hook-like), and characteristic split spots on the first and fourth trunk rings. These may represent a separate species

Hippocampus whitei Bleeker 1855

Common names
White's seahorse; New Holland seahorse; Sydney seahorse (Australia)

Synonyms
H. novaehollandiae Steindachner 1866



Description
Maximum recorded adult height: 13 cm²
Trunk rings: 11
Tail rings: 35 (32–36)
HL/SnL: 2.3 (2.0–2.7)
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 18 (16–20)
Pectoral fin rays: 16–17 (15–18)
Coronet: High, inclined backwards, with seven sharp angles or points at top
Spines: Variable; ranging from low to moderately developed and from rounded to quite sharp
Other distinctive characteristics: Long snout; prominent, sharp eye spines; single or double cheek spines; head quite narrow

Colour/pattern: Dull greyish brown to yellow; often mottled brown with a net-like pattern of reticulating dark lines; may have saddles of paler colour across dorso-lateral surface

Confirmed distribution
Australia; Solomon Islands

Suspected distribution
No other locations suspected

Habitat
Maximum reported depth 25 m[110]; weedy inshore areas, seagrass beds, sponges, under jetties on kelp holdfast[110]; man-made objects such as shark nets[111]

Life history
Breeding season October to April[112]; found in pairs in the wild[111]; sexually monogamous in the wild; egg diameter averages 1.8 mm[26]; gestation duration 21–22 days[111]; length at birth averages 8.5 mm[26]; brood size usually 100–250[26]

Trade
Live for aquarium or hobbyist use

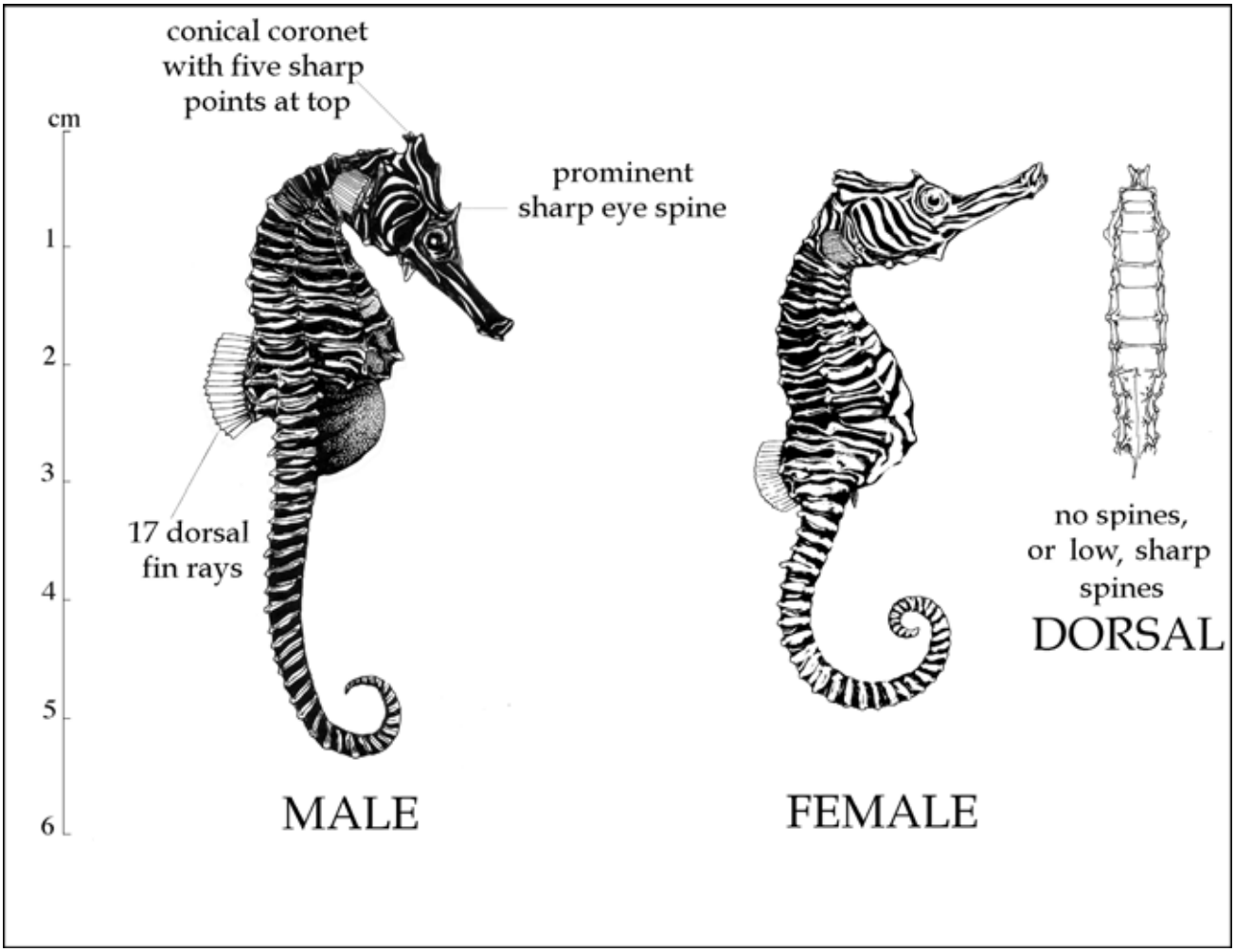
Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. whitei* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. whitei* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001

Similar species
- *H. camelopardalis*, known only from South Africa and east Africa, has more tail rings and a coronet that is rounded at the top and that lacks the seven sharp angles or spines; it also often has a dark spot at the top of the coronet

Hippocampus zebra Whitley 1964

Common names
Zebra seahorse

Synonyms



None known

Description

Maximum recorded adult height: 9.4 cm[113]
Trunk rings: 11
Tail rings: 38–39
HL/SnL: 2.1–2.2
Rings supporting dorsal fin: 2 trunk rings and 1 tail ring
Dorsal fin rays: 17
Pectoral fin rays: 15–16
Coronet: Medium, conical, with five tiny points on top (not splayed)
Spines: Low, small and sharp, or none
Other distinctive characteristics: Prominent sharp eye spine
Colour/pattern: Black (or dark brown) and white striped all over

Confirmed distribution
Australia

Suspected distribution
No other locations suspected

Habitat
Maximum reported depth 69 m[113]; found on coral reefs[2]

Life history
Unknown

Trade
Not known in international trade

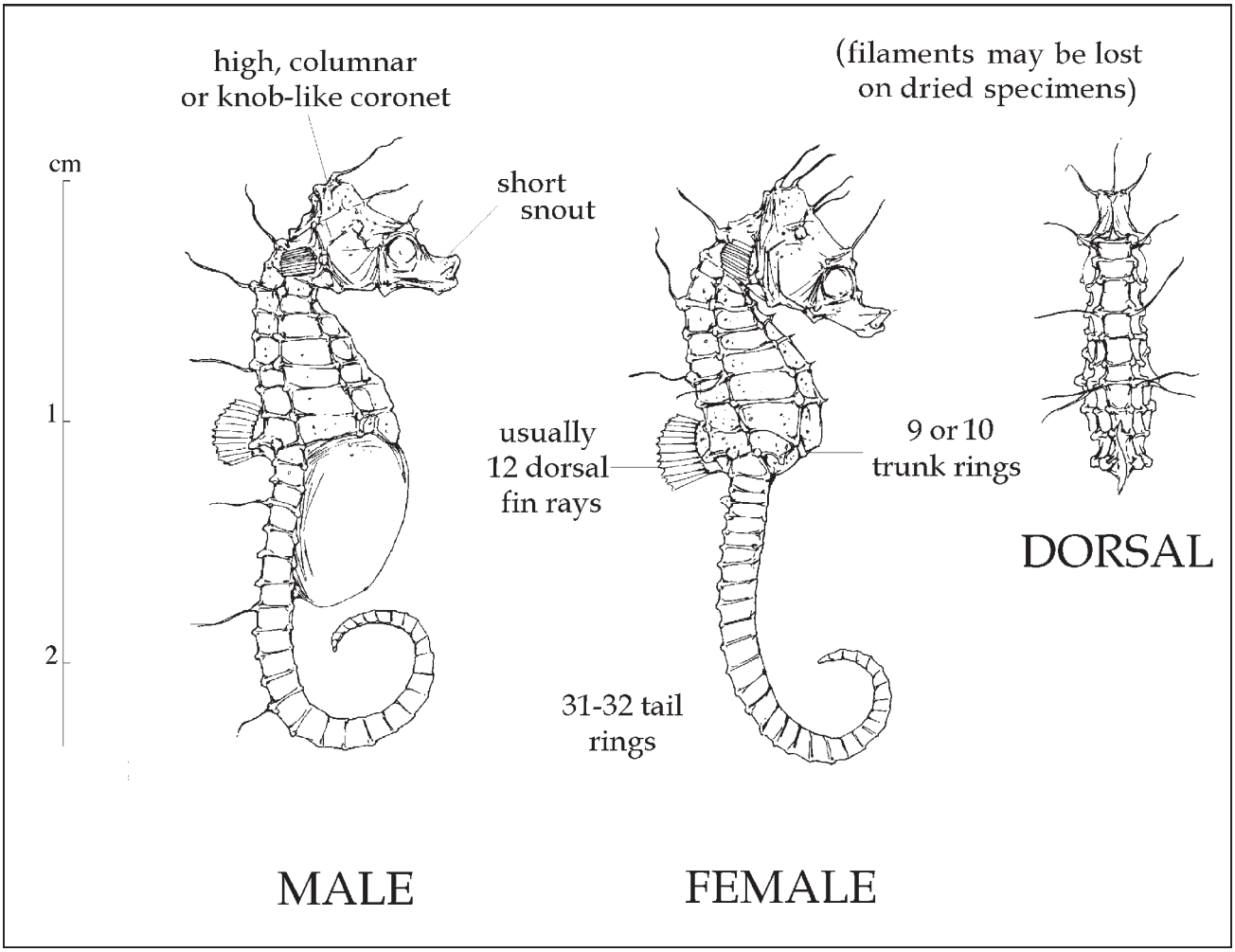
Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. zebra* is listed as Data Deficient by IUCN[13]. Environment Australia lists the conservation status of *H. zebra* as Data Deficient[39]; Australian populations were moved under the Australian Wildlife Protection Act in 1998 and placed under the Environment Protection and Biodiversity Conservation Act in 2001

Similar species
- *H. trimaculatus* (zebra-striped form) has more tail rings, more dorsal fin rays, a lower coronet and a hook-like cheek spine

Hippocampus zosterae Jordan and Gilbert 1882

Common names
Dwarf seahorse (U.S.A.); *caballito enano* (Spanish, Mexico)

Synonyms
H. rosamondae Borodin 1928; *H. regulus* Ginsburg 1933



Description
Maximum recorded adult height: 2.5 cm^2
Trunk rings: 9–10
Tail rings: 31–32
HL/SnL: 4.2–4.3
Rings supporting dorsal fin: 2 trunk rings (no tail rings)
Dorsal fin rays: 12
Pectoral fin rays: 11–12
Coronet: High, columnar or knob-like, without spines or projections
Spines: Low or knob-like
Other distinctive characteristics: Short snout less than one-third head length; skin often covered in tiny warts

Colour/pattern: Beige, yellow, green, black; mottling variable (distinct to absent); may have white markings like splashes of paint; some specimens have dark spots

Confirmed distribution
Bahamas; Mexico, United States of America

Suspected distribution
No other locations are suspected

Habitat
Seagrass beds in summer, in winter moving deeper or into tide pools with heavy vegetation, may move with tidal currents[114]; distribution correlated with presence, abundance and length of seagrasses[115]

Life history
Breeding season February to November[114]; sexually monogamous in captivity[22]; maximum reported brood size 55[114]; egg diameter averages 1.3 mm[26]; gestation duration averages 11 days[15]; length at birth averages 8 mm[15]

Trade
Live for aquarium or hobbyist use

Conservation status
The entire genus *Hippocampus* is listed in Appendix II of CITES, effective May 2004[1]. *H. zosterae* is listed as Data Deficient by IUCN[13]. Mexican populations are listed in the NOM-059-SEMARNAT-2001 as species subject to special protection; Mexico prohibits the intentional capture and trade of wild seahorses, permitting only the commercialisation of cultured and incidentally caught seahorses

Similar species
- *H. lichtensteinii*, which is known only from the Red Sea and Indian Ocean

Other notes
- Males have longer tails and snouts than do females[26]
- Specimens brought into aquaria usually lose their skin filaments within a couple of days[116]

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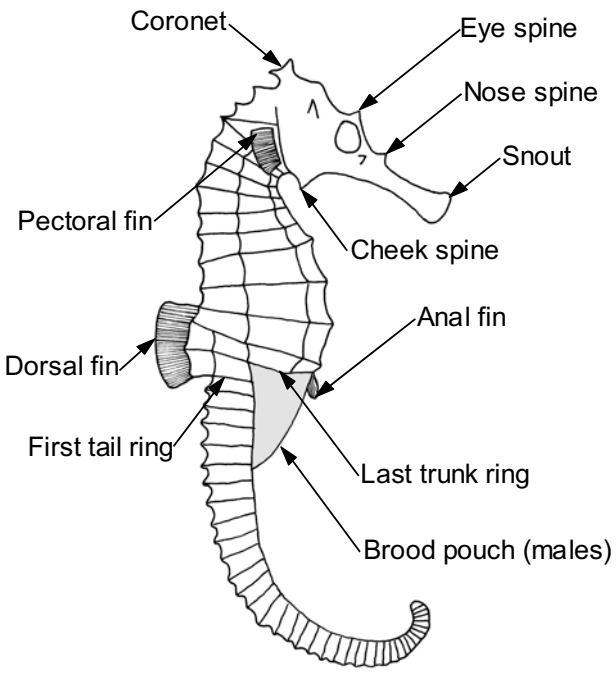
APPENDIX A. SEAHORSE IDENTIFICATION DATA SHEET

Specimen Data

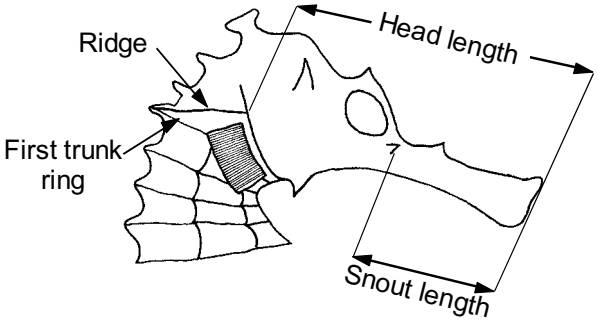
Height	
Head Length (HL)	
Snout Length (SnL)	
HL/SnL (calculated)	
Tail rings	
Dorsal fin rays	
Pectoral fin rays	
Trunk rings	
Trunk rings supporting the dorsal fin	
Tail rings supporting the dorsal fin	
Cheek spines	
Eye spines	

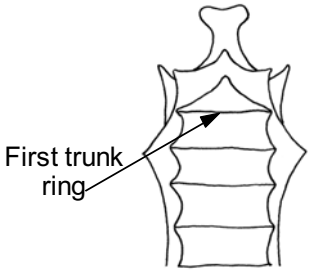


Species Checklist

	1	2	3	4	5	6	7	8	9
H. abdominalis									
H. algiricus									
H. angustus									
H. barbouri									
H. bargibanti									
H. borboniensis									
H. breviceps									
H. camelopardalis									
H. capensis									
H. comes									
H. coronatus									
H. denise									
H. erectus									
H. fisheri									
H. fuscus									
H. guttulatus									
H. hippocampus									
H. histrix									
H. ingens									
H. jayakari									
H. kelloggi									
H. kuda									
H. lichtensteinii									
H. minotaur[2]									
H. mohnikei									
H. reidi									
H. sindonis									
H. spinosissimus									
H. subelongatus									
H. trimaculatus									
H. whitei									
H. zebra									
H. zosterae									

1 = height 2 = HL/SnL 3 = tail rings
4 =dorsal fin rays 5 = pectoral fin rays
6 = trunk rings 7 = rings supporting dorsal fin
8 = cheek spines 9 = eye spines



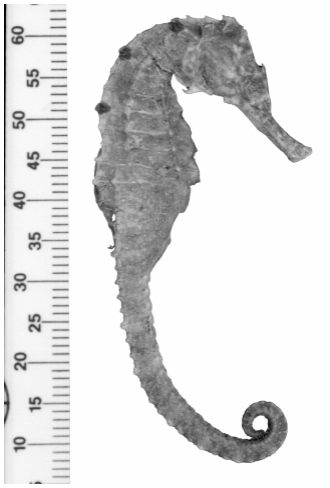


APPENDIX B. HOW TO USE THE SPECIES CHECKLIST

Figure 3 shows a photograph of a dried seahorse specimen and data about the specimen as collected according to the procedure outlined in Section 4.2, Step B. In identifying the specimen, these data were compared to the information in Tables 1–6, according to the procedure outlined in Section 4.2, Step C (Appendix A. The completed checklist is shown as Table 7). The following text explains how the columns of the checklist were completed using this procedure:

1. According to Table 1, only 19 species have a maximum size equal to or greater than 14.3 cm. An X was placed in column 1 for each of these 19 species.
2. According to Table 2, of the 19 species noted in column 1, only 15 could have a HL/SnL of 2.4. An X was placed in column 2 for each of these 15 species.
3. According to Table 3, of the 15 species noted in column 2, only 9 could have 38 tail rings. An X was placed in column 3 for each of these 9 species.
4. According to Table 4, of the 9 species noted in column 3, only 7 could have 19 dorsal fin rays. An X was placed in column 4 for each of these 7 species.
5. According to Table 5, all of the 7 species noted in column 4 could have 17 pectoral fin rays. An X was placed in column 5 for each of the 7 species.
6. According to Table 6, all of the 7 species noted in column 5 could have 11 trunk rings. An X was placed in Column 6 for each of the 7 species.
7. According to Table 6, all of the 7 species noted in column 6 could have the dorsal fin supported by 2 trunk rings and 1 tail ring. An X was placed in column 7 for each of the 7 species.
8. According to Table 6, of the 7 species noted in column 7, only 6 could have only 1 cheek spine. An X was placed in column 8 for each of these 6 species.
9. According to Table 6, all of the 6 species noted in column 8 could have only 1 cheek spine. An X was placed in column 9 for each of the 6 species.

At this point the identification of the specimen was narrowed to 6 possible species: *H. erectus, H. guttulatus, H. ingens, H. reidi, H. spinosissimus* and *H. trimaculatus*. The specimen was then compared to the species descriptions in Section 5.0 of this guide and identified as *H. trimaculatus* based on the following characters: low, rounded spines; sharp, hook-shaped cheek spine; low coronet; and distinctive dark spots on the dorso-lateral region of the 1st, 4th and 7th trunk rings.



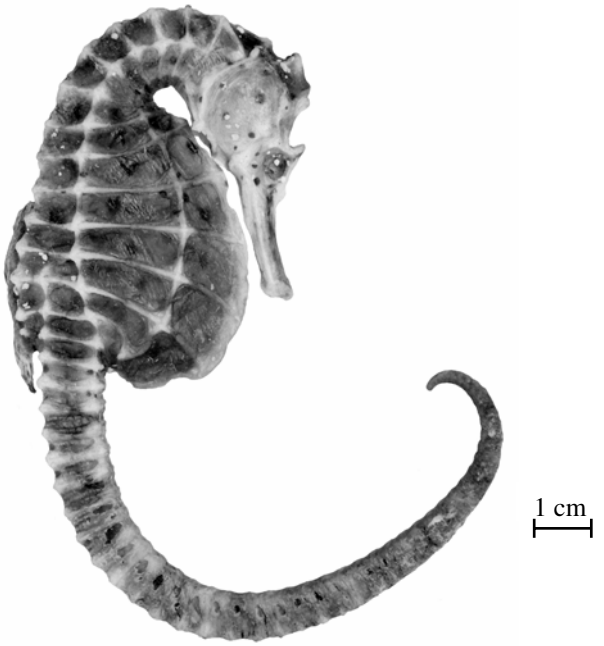
Height	14.3 cm
Snout length (SnL)	1.1 cm
Head length (HL)	2.6 cm
HL/SnL (calculated)	2.4
Tail rings	38
Dorsal fin rays	19
Pectoral fin rays	17
Trunk rings	11
Trunk rings supporting the dorsal fin	2
Tail rings supporting the dorsal fin	1
Cheek spines	1
Eye spines	1

Figure 3. Example of a Dried Seahorse Specimen with Morphological Data

Table 7. Completed Species Checklist for Seahorse Specimen Illustrated in Figure 3

	1	2	3	4	5	6	7	8	9
H. abdominalis	X	X							
H. algiricus	X	X							
H. angustus	X	X							
H. barbouri	X	X							
H. bargibanti									
H. borboniensis	X	X	X						
H. breviceps									
H. camelopardalis									
H. capensis									
H. comes	X	X							
H. coronatus									
H. denise									
H. erectus	X	X	X	X	X	X	X	X	X
H. fisheri									
H. fuscus	X	X							
H. guttulatus	X	X	X	X	X	X	X	X	X
H. hippocampus	X								
H. histrix	X								
H. ingens	X	X	X	X	X	X	X	X	X
H. jayakari	X	X	X	X	X	X	X		
H. kelloggi	X								
H. kuda	X	X	X						
H. lichtensteinii									
H. minotaur									
H. mohnikei									
H. reidi	X	X	X	X	X	X	X	X	X
H. sindonis									
H. spinosissimus	X	X	X	X	X	X	X	X	X
H. subelongatus	X								
H. trimaculatus	X	X	X	X	X	X	X	X	X
H. whitei									
H. zebra									
H. zosterae									

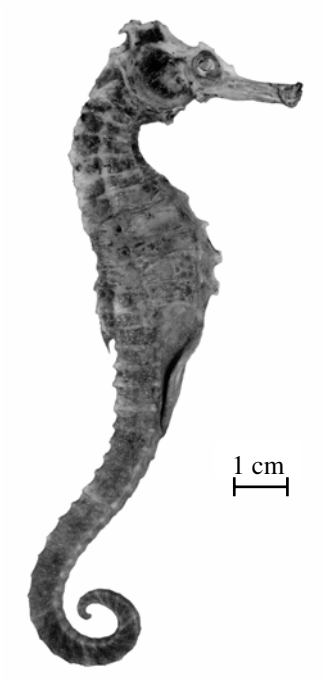
APPENDIX C. PHOTOGRAPHIC ATLAS OF DRIED SEAHORSES



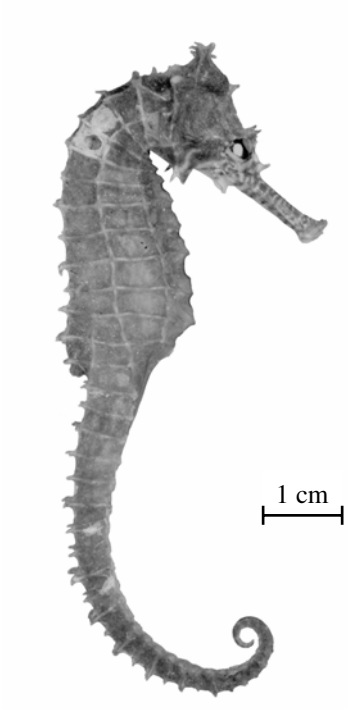
adult

juvenile

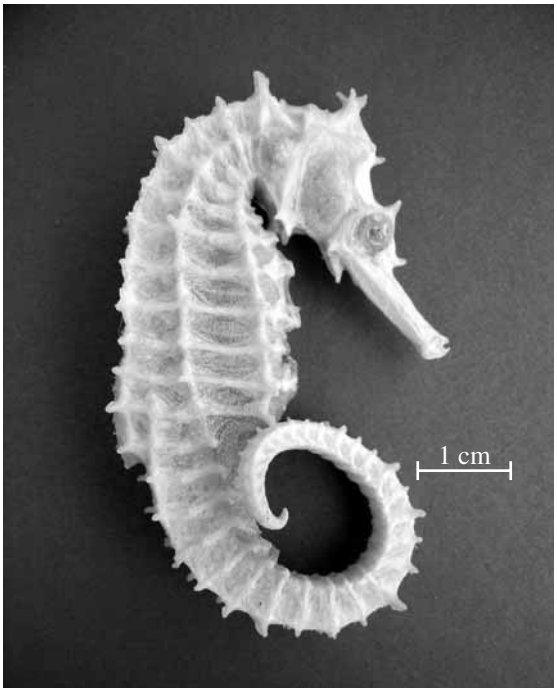
Hippocampus abdominalis



Hippocampus algiricus

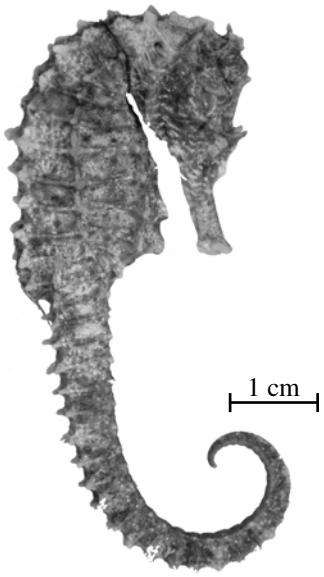


Hippocampus barbouri

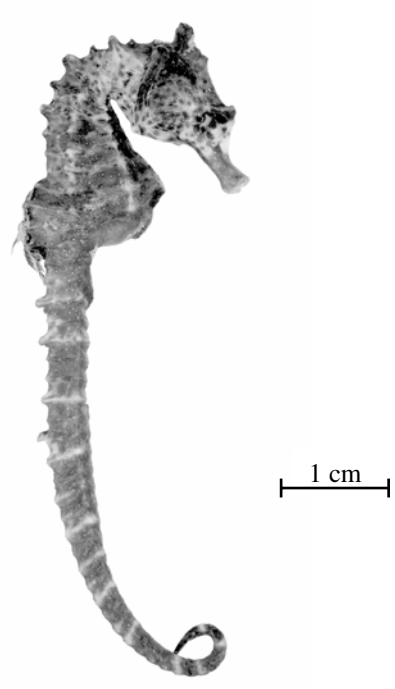


bleached specimen

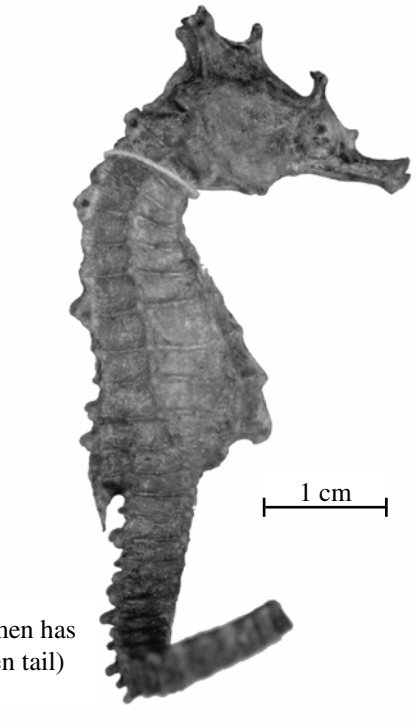
Hippocampus barbouri



Hippocampus borboniensis

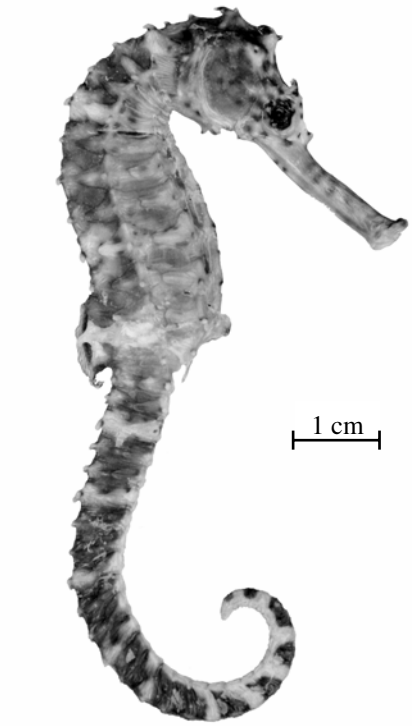


Hippocampus breviceps

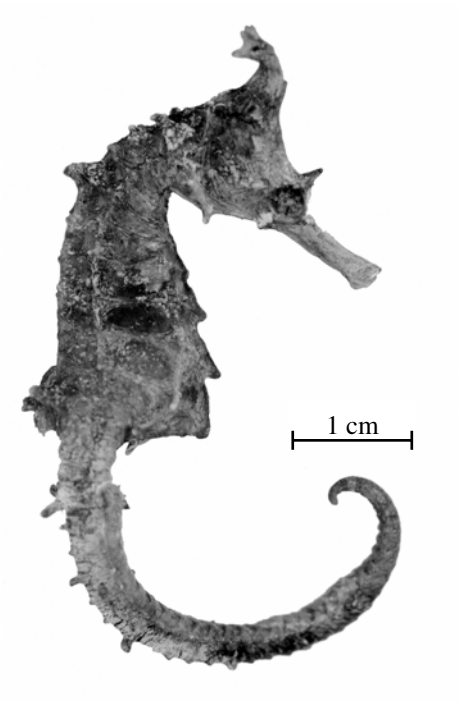


(specimen has a broken tail)

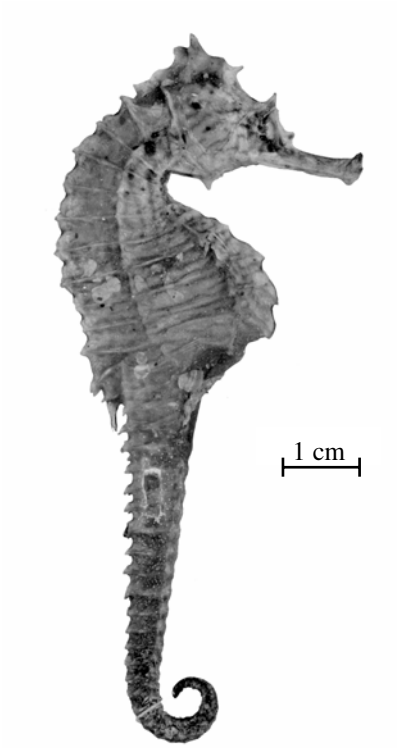
Hippocampus camelopardalis



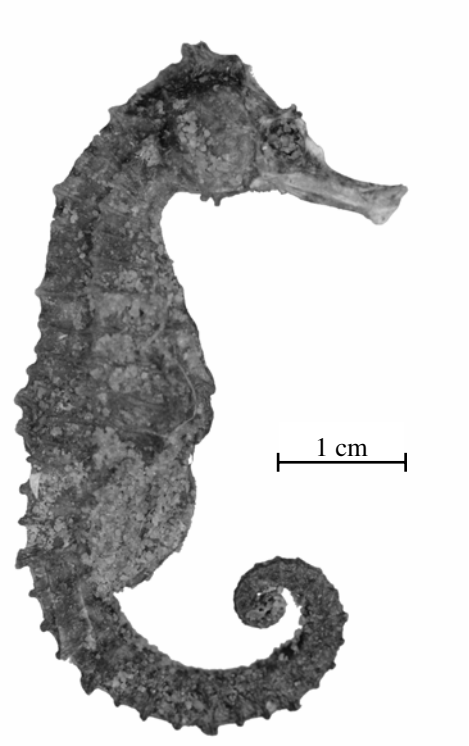
Hippocampus comes



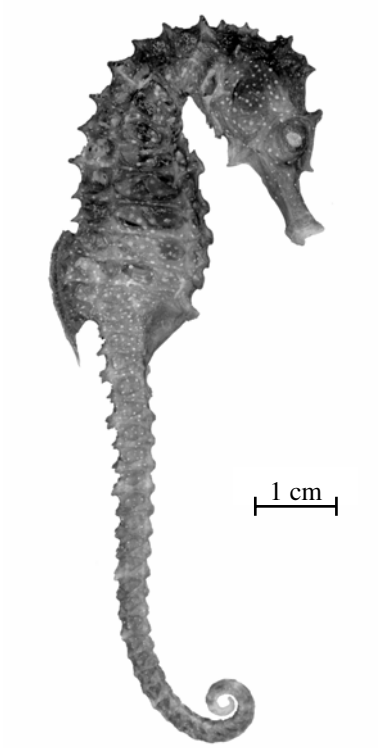
Hippocampus coronatus



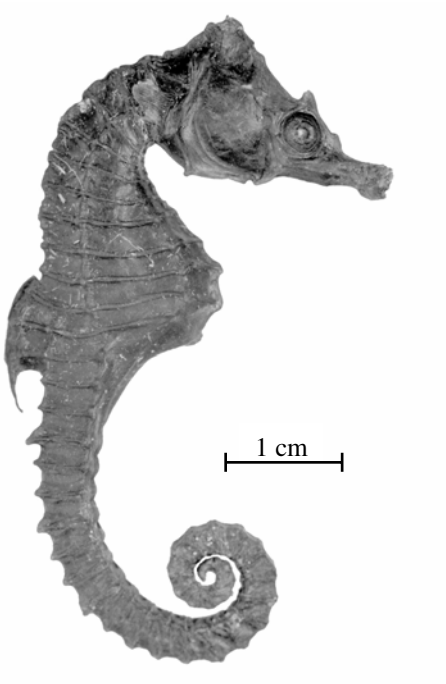
Hippocampus erectus



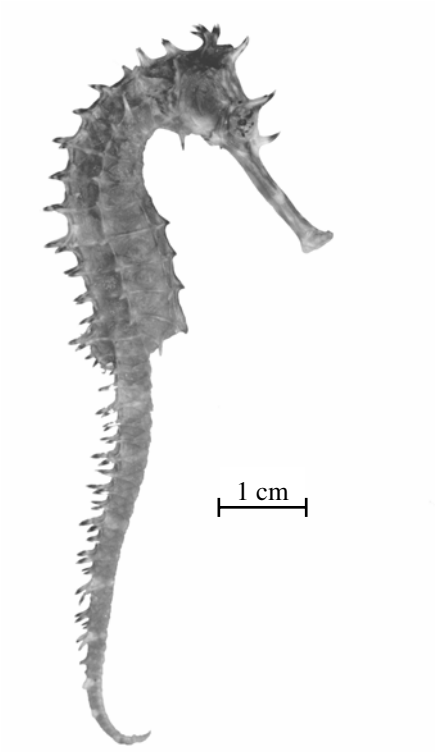
Hippocampus fuscus



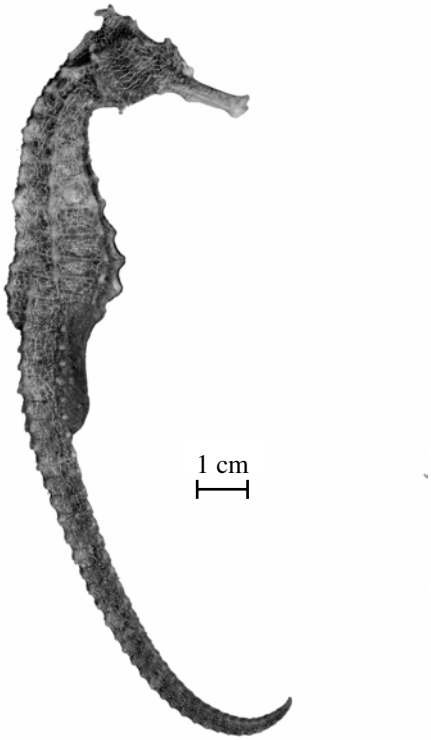
Hippocampus guttulatus



Hippocampus hippocampus

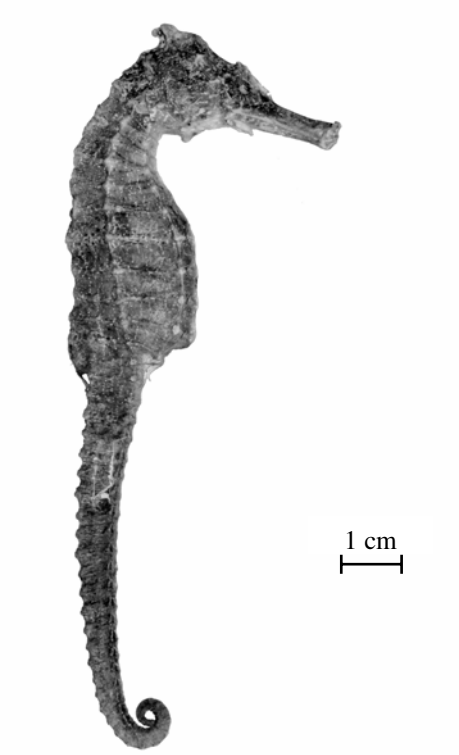


Hippocampus histrix

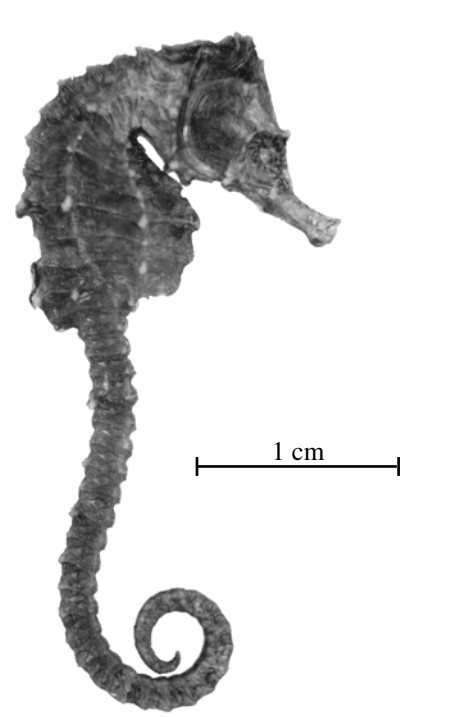


Hippocampus ingens

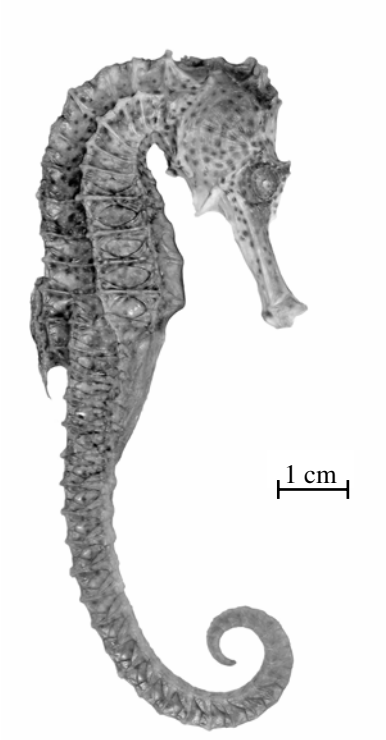
Hippocampus kellogi



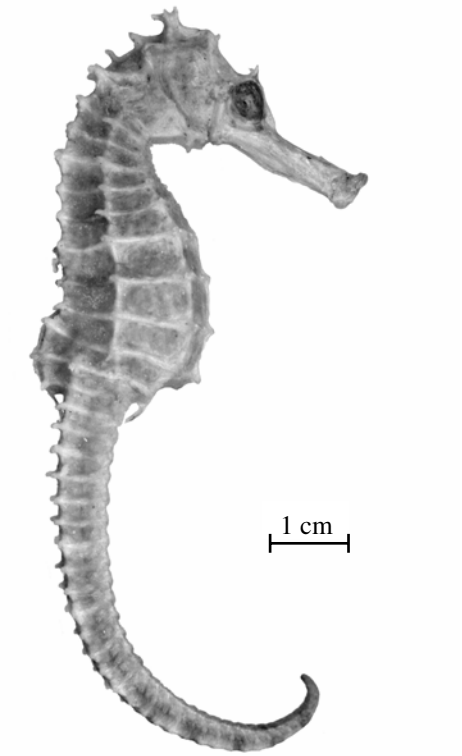
Hippocampus kuda



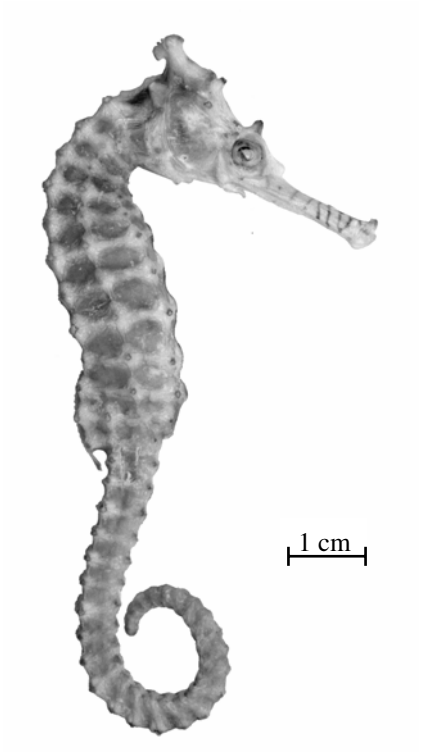
Hippocampus mohnikei



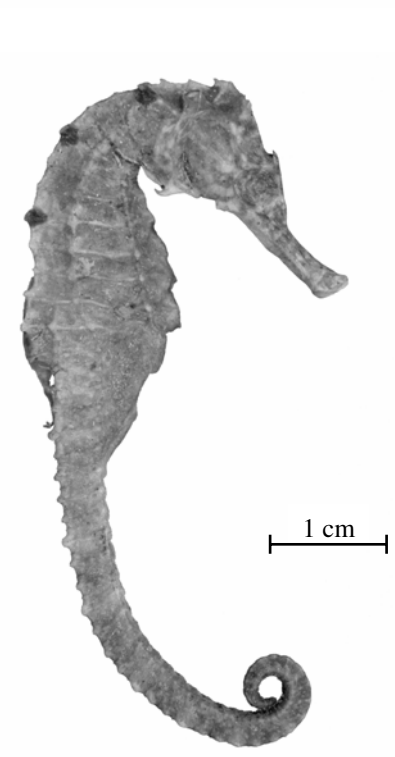
Hippocampus reidi



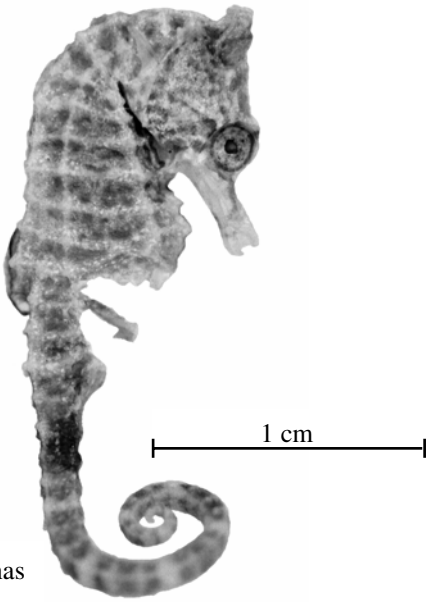
Hippocampus spinosissimus



Hippocampus subelongatus



Hippocampus trimaculatus



(specimen has a damaged brood pouch)

Hippocampus zosterae

APPENDIX D. TAXONOMY OF *H. histrix* AND *H. kuda*

The confusion of seahorse taxonomy is not easily resolved. The names *H. histrix* and *H. kuda* are particularly problematic, having been casually used for virtually any spiny seahorse (*H. histrix*) and any smooth seahorse (*H. kuda*) from the Indo-Pacific basin. Untangling these species complexes, wherein a single name is applied to many species, is difficult, and a final resolution will only emerge after more detailed analysis. It is not surprising that these two problematic species complexes are found in the Indo-Pacific basin, given the high species diversity of the area and the dearth of work done on seahorses in the region[2].

The following notes should be considered when reviewing publications that cite these names, as many sources are erroneous[2].

H. histrix

The name *H. histrix* has been used across the Indo-Pacific basin, apparently indiscriminately, to refer to any spiny seahorse. This guide distinguishes the true *H. histrix* and uses morphometric and, in most cases, genetic data to allocate the remaining species to *H. angustus*, *H. barbouri*, *H. jayakari* and *H. spinosissimus*. Some of the species emerging from the *H. histrix* complex, such as *H. barbouri*, may turn out to be species complexes in themselves. The wide range of *H. histrix* (from Mozambique to Tahiti) also suggests that it may incorporate further cryptic species that are morphologically indistinguishable but reproductively isolated[2].

H. kuda

The name *H. kuda*, a counterpart for *H. histrix*, has been used for all non-spiny seahorses in the Indo-Pacific basin. Taxonomic work has suggested that at least 15 names for apparent species were merely synonyms for *H. kuda*[117]. Conversely, *H. barbouri*, *H. borboniensis, H. comes*, *H. fisheri, H. fuscus* and *H. kelloggi* have been isolated as species that had been subsumed into the *H. kuda* complex. Genetic data indicate that *H. algiricus*, *H. capensis*, *H. ingens* and *H. reidi* are close relatives but distinct species[2].

APPENDIX E. DISTRIBUTION OF SEAHORSE SPECIES BY COUNTRY

A distribution is listed here as confirmed where specimens or photographs of that species have been seen by the senior author of this guide. A distribution is cited as suspected if (a) confirmed sightings occur on either side of the country in question and it appears biologically likely that the species could also occur in the intervening country; or (b) specimens or photographs have been observed but there is some question (raised by genetic evidence, for example) as to the identification or precise location of the origin of those specimens. This assessment of seahorse distributions is less conservative than that of Lourie *et al*[2] to extrapolate information for countries for which concrete data is lacking. Additional species to those named might be found in any particular country in the same ocean basin as the countries of confirmed distribution.

Country	Confirmed Distribution	Suspected Distribution
Albania		*H. guttulatus; H. hippocampus*
Algeria	*H. hippocampus*	*H. algiricus; H. guttulatus*
Angola	*H. algiricus*	
Antigua and Barbuda		*H. erectus; H. reidi*
Argentina		*H. erectus*
Australia	*H. abdominalis; H. angustus H. bargibanti; H. breviceps; H. kuda; H. minotaur; H. spinosissimus; H. subelongatus; H. trimaculatus; H. whitei; H. zebra*	*H. fisheri; H. kelloggi*
Bahamas	*H. erectus; H. reidi; H. zosterae*	
Bahrain		*H. fuscus; H. jayakari; H. kelloggi*
Bangladesh		*H. histrix; H. kelloggi; H. kuda; H. spinosissimus; H. trimaculatus*
Barbados	*H. reidi*	*H. erectus*
Belgium		*H. guttulatus; H. hippocampus*
Belize	*H. erectus; H. reidi*	
Benin	*H. algiricus*	
Bosnia and Herzegovina		*H. guttulatus; H. hippocampus*
Brazil	*H. reidi*	*H. erectus*
Brunei Darussalam		*H. histrix; H. kelloggi; H. kuda; H. spinosissimus; H. trimaculatus*
Cambodia	*H. kuda; H. spinosissimus; H. trimaculatus*	*H. histrix; H. kelloggi; H. mohnikei*
Cameroon		*H. algiricus*
Canada	*H. erectus*	
China	*H. histrix; H. kelloggi*	*H. kuda; H. mohnikei; H. spinosissimus; H. trimaculatus*

China (Hong Kong SAR)	*H. kuda; H. trimaculatus*	*H. histrix; H. kelloggi; H. spinosissimus*
China (Province of Taiwan)	*H. kuda; H. spinosissimus; H. trimaculatus*	*H. histrix; H. kelloggi*
Columbia	*H. ingens; H. reidi*	*H. erectus*
Comoros		*H. borboniensis; H. fuscus; H. histrix*
Congo		*H. algiricus*
Congo, Democratic Republic of		*H. algiricus*
Costa Rica	*H. ingens*	*H. erectus; H. reidi*
Côte d'Ivoire	*H. algiricus*	
Croatia	*H. guttulatus*	*H. hippocampus*
Cuba	*H. erectus; H. reidi*	
Cyprus	*H. guttulatus*	*H. fuscu; H. hippocampus*
Djibouti	*H. fuscus*	*H. jayakari; H. kelloggi; H. lichtensteinii*
Dominica		*H. erectus; H. reidi*
Dominican Republic		*H. erectus; H. reidi*
Ecuador	*H. ingens*	
Egypt		*H. fuscus; H. guttulatus; H. hippocampus; H. jayakari; H. kelloggi; H. lichtensteinii*
El Salvador	*H. ingens*	
Equatorial Guinea		*H. algiricus*
Eritrea		*H. fuscus; H. jayakari; H. kelloggi; H. lichtensteinii*
Fiji	*H. kuda*	*H. histrix*
France	*H. guttulatus; H. hippocampus*	
France (Caribbean territories)		*H. erectus; H. reidi*
France (New Caledonia)	*H. bargibanti; H. histrix; H. kuda*	*H. fisheri*
France (French Guiana)		*H. erectus; H. reidi*
France (Réunion)	*H. borboniensis; H. histrix*	*H. fuscus*
France (Tahiti)	*H. histrix; H. kuda; H. trimaculatus*	
Gabon		*H. algiricus*
Gambia	*H. algiricus*	*H. hippocampus*
Ghana	*H. algiricus*	
Greece	*H. guttulatus; H. hippocampus*	
Grenada	*H. reidi*	*H. erectus*
Guatemala	*H. erectus; H. ingens*	*H. reidi*
Guinea	*H. algiricus; H. hippocampus*	
Guinea-Bissau		*H. algiricus; H. hippocampus*

Guyana		*H. erectus; H. reidi*
Haiti	*H. erectus; H. reidi*	
Honduras	*H. erectus; H. reidi*	*H. ingens*
India	*H. fuscus; H. histrix; H. kelloggi; H. kuda; H. trimaculatus*	*H. spinosissimus*
Indonesia	*H. barbouri; H. bargibanti; H. comes; H. denise; H. histrix; H. kelloggi; H. kuda; H. spinosissimus; H. trimaculatus*	
Iran, Islamic Republic of		*H. fuscus; H. jayakari; H. kelloggi*
Iraq		*H. kelloggi*
Israel	*H. jayakari*	*H. fuscus; H. guttulatus; H. hippocampus; H. lichtensteinii; H. kelloggi*
Italy	*H. guttulatus; H. hippocampus*	
Jamaica	*H. reidi*	*H. erectus*
Japan	*H. bargibanti; H. coronatus; H. histrix; H. kelloggi; H. kuda; H. mohnikei; H. sindonis; H. trimaculatus*	
Kenya		*H. fuscus; H. histrix; H. kelloggi*
Kiribati		*H. histrix; H. kuda*
Kuwait		*H. fuscus; H. jayakari; H. kelloggi*
Lebanon		*H. fuscus; H. guttulatus; H. hippocampus*
Liberia	*H. algiricus*	
Libya		*H. guttulatus; H. hippocampus*
Madagascar	*H. borboniensis*	*H. fuscus; H. histrix*
Malaysia	*H. barbouri; H. comes; H. denise; H. histrix; H. kelloggi; H. kuda; H. spinosissimus; H.trimaculatus*	*H. bargibanti*
Malta	*H. guttulatus; H. hippocampus*	
Mauritania		*H. hippocampus*
Mauritius	*H. borboniensis; H. histrix*	*H. fuscus*
Mexico	*H. erectus; H. ingens; H. reidi; H. zosterae*	
Micronesia, Federated States of	*H. denise; H. histrix; H. kuda*	*H. bargibanti*
Monaco		*H. guttulatus; H. hippocampus*
Morocco	*H. guttulatus*	*H. hippocampus*

Mozambique	*H. borboniensis;* *H. camelopardalis*	*H. fuscus; H. histrix*
Myanmar	*H. spinosissimus;* *H. trimaculatus*	*H. histrix; H. kelloggi; H. kuda*
Nauru		*H. histrix; H. kuda*
Netherlands	*H. guttulatus; H. hippocampus*	
Netherlands (Caribbean territories)		*H. erectus; H. reidi*
New Zealand	*H. abdominalis*	
Nicaragua	*H. erectus; H. ingens; H. reidi*	
Nigeria	*H. algiricus*	
Oman	*H. jayakari*	*H. fuscus; H. kelloggi*
Pakistan	*H. jayakari; H. kelloggi; H. kuda*	*H. fuscus*
Palau	*H. denise*	*H. bargibanti; H. histrix; H. kuda*
Panama	*H. erectus; H. ingens; H. reidi*	
Papua New Guinea	*H. bargibanti; H. denise;* *H. histrix; H. kuda*	*H. spinosissimus; H. trimaculatus*
Peru	*H. ingens*	
Philippines	*H. barbouri; H. bargibanti;* *H. comes; H. denise; H. histrix;* *H. kelloggi; H. kuda;* *H. spinosissimus; H.trimaculatus*	
Portugal	*H. guttulatus; H. hippocampus*	
Qatar		*H. fuscus; H. jayakari; H. kelloggi*
Saint Kitts and Nevis	*H. erectus*	*H. reidi*
Saint Lucia		*H. erectus; H. reidi*
Saint Vincent and the Grenadines		*H. erectus; H. reidi*
Samoa	*H. histrix*	*H. kuda*
São Tomé and Principe	*H. algiricus*	
Saudi Arabia	*H. fuscus*	*H. jayakari; H. kelloggi;* *H. lichtensteinii*
Senegal	*H. algiricus; H. hippocampus*	*H. guttulatus*
Serbia and Montenegro		*H. guttulatus; H. hippocampus*
Seychelles		*H. fuscus; H. histrix; H. kelloggi*
Sierra Leone	*H. algiricus*	
Singapore	*H. comes; H. kuda;* *H. spinosissimus; H.trimaculatus*	*H. histrix; H. kelloggi*
Slovenia		*H. guttulatus; H. hippocampus*
Solomon Islands	*H. denise; H. kuda; H. whitei*	*H. bargibanti; H. histrix*
Somalia		*H. fuscus; H. jayakari;* *H. kelloggi; H. lichtensteinii*
South Africa	*H. borboniensis;* *H. camelopardalis; H. capensis;* *H. histrix*	*H. fuscus*

Spain	*H. guttulatus; H. hippocampus*	
Sri Lanka	*H. fuscus; H. spinosissimus*	*H. histrix; H. kelloggi; H. kuda; H. trimaculatus*
Sudan		*H. fuscus; H. jayakari; H. kelloggi; H. lichtensteinii*
Suriname		*H. erectus; H. reidi*
Syria		*H. fuscus; H. guttulatus; H. hippocampus*
Tanzania, United Republic of	*H. borboniensis; H. camelopardalis; H. histrix; H. kelloggi*	*H. fuscus*
Thailand	*H. comes; H. kelloggi; H. kuda; H. spinosissimus; H. trimaculatus*	*H. histrix; H. mohnikei*
Togo		*H. algiricus*
Tonga	*H. histrix; H. kuda*	
Trinidad and Tobago		*H. erectus; H. reidi*
Tunisia		*H. guttulatus; H. hippocampus*
Turkey		*H. fuscus; H. guttulatus; H. hippocampus*
Tuvalu		*H. histrix; H. kuda*
United Arab Emirates		*H. fuscus; H. jayakari; H. kelloggi*
United Kingdom	*H. guttulatus; H. hippocampus*	
United Kingdom (Caribbean territories)	*H. erectus; H. reidi*	
United Republic of Tanzania	*H. borboniensis; H. camelopardalis; H. histrix; H. kelloggi*	*H. fuscus*
United States of America	*H. erectus; H. ingens; H. reidi; H. zosterae*	
United States of America (American Samoa)		*H. histrix; H. kuda*
United States of America (Caribbean territories)		*H. erectus; H. reidi*
United States of America (Hawaii)	*H. fisheri; H. histrix; H. kuda*	
Uruguay		*H. erectus*
Vanuatu	*H. denise*	*H. bargibanti; H. histrix; H. kuda*
Venezuela	*H. erectus; H. reidi*	
Western Sahara		*H. hippocampus*
Viet Nam	*H. comes; H. histrix; H. kelloggi; H. kuda; H. spinosissimus; H. trimaculatus*	*H. mohnikei*
Yemen		*H. fuscus; H. jayakari; H. kelloggi; H. lichtensteinii*

APPENDIX F. COLOUR PLATES OF SEAHORSE SPECIES

Hippocampus abdominalis

Hippocampus algiricus

Hippocampus angustus

Hippocampus barbouri

Hippocampus bargibanti

Hippocampus borboniensis

Hippocampus breviceps

Hippocampus camelopardalis

Hippocampus capensis

Hippocampus comes

Hippocampus coronatus

 *Hippocampus denise*	 *Hippocampus erectus*
 *Hippocampus fisheri*	 *Hippocampus fuscus*
 *Hippocampus guttulatus*	 *Hippocampus hippocampus*

Hippocampus histrix

Hippocampus ingens

Hippocampus jayakari

Hippocampus kelloggi

Hippocampus kuda

Hippocampus lichtensteinii

Hippocampus minotaur

Hippocampus mohnikei

Hippocampus reidi

Hippocampus sindonis

Hippocampus spinosissimus

Hippocampus subelongatus

Hippocampus trimaculatus

Hippocampus whitei

Hippocampus zebra

Hippocampus zosterae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