

Revision of the Australian Seahorses of the Genus *Hippocampus* (Syngnathiformes: Syngnathidae) with Descriptions of Nine New Species

RUDIE H. KUITER

Ichthyology, Museum Victoria, Melbourne Victoria 3001, Australia
rudie.kuiter@zoonetics.com • syngnathiformes@zoonetics.com

ABSTRACT. Australian species of seahorses (genus *Hippocampus*) are reviewed and descriptions of nine new species from Australian and adjacent waters are presented: *H. jugumus* n.sp. (Lord Howe Island), *H. biocellatus* n.sp. (Shark Bay, Western Australia), *H. alatus* n.sp. (northern Australia), *H. semispinosus* n.sp. (Timor Sea, southern Indonesia), *H. montebelloensis* n.sp. (Monte Bello Islands, Western Australia), *H. procerus* n.sp. (tropical eastern Australia), *H. multispinus* n.sp. (northern Australia), *H. hendriki* n.sp. (northeastern Queensland), and *H. grandiceps* n.sp. (Gulf of Carpentaria). A total of twenty-four species have been collected in Australian waters, and additional species may be found as these are known to occur in neighbouring waters. Diagnosis and a key for the Australian species are provided.

KUITER, RUDIE H., 2001. Revision of the Australian seahorses of the genus *Hippocampus* (Syngnathiformes: Syngnathidae) with descriptions of nine new species. *Records of the Australian Museum* 53(3): 293–340.

In compiling information for a book on the syngnathid fishes of the world (Kuiter, 2000), it became clear that despite recent studies and the publication of a book on the taxonomy of seahorses (Lourie *et al.*, 1999), confusion remains. Eschmeyer (1998) lists 112 nominal species worldwide, many representing the same taxon and others wrongly synonymised since their initial original publication. An identification guide to the world's syngnathid fishes (Kuiter, 2000) suggests over 60 valid seahorses species worldwide. Applying the correct scientific name to seahorse species has always been problematic. In Australia, Whitley & Allan (1958) recognised eight species and suggested that there are about 100 valid species worldwide. Paxton *et al.* (1989) recognised 9 Australian species; and, Gomon, 1997, added a new species. An identification guide to the world's species (Lourie *et al.*, 1999) recognised only 32 species worldwide, but did not deal with species-complexes. The difficulty in working with seahorses stems primarily from their peculiar

morphology, with the absence of many of the characters that fish taxonomists traditionally rely on to distinguish species. In examining material from Australian collections for this revision, specimens of the same taxon were frequently found to be identified as a variety of species, often in relation to their relative presence or absence of spines. This work revealed that some species with little spine development in adults have spiny juveniles. The names *H. kuda* long applied to many smooth species and *H. histrix* frequently used for spiny species in tropical regions has given rise to the perception of wide-spread distributions, but it is clear that most species are highly localised and that there are a number of species-complexes whose members are variously distributed in different faunal regions.

Australia supports a number of different bioregions that range from temperate to tropical, and have Pacific or Indian Ocean origins. The pelagic regions are generally divided into four zones: north, south, east and west, whilst demersal

areas are often localised to small coastal sections that are determined by their different geological and biological make-ups, the affect of currents, tides and temperatures, and interconnection or isolation. Some 17 different demersal bioregions were identified in a recent CSIRO study, based on the distribution of fish species around Australia (Interim Marine Bioregionalisation for Australia, 1999). Much of Australia's diversity may be attributed to the climatic changes that occurred during glacial periods, affecting sea-levels and temperatures and causing populations to move or adapt to altering conditions in different places. Populations on the east and west coasts were able to move latitudinally when temperatures changed thus presenting little or no pressure for change. However, on the south coast, populations became isolated on the eastern or western sides or were split allowing for speciation over time. Seahorses living in estuaries were most likely to have remained in their original areas, as their offspring are not often dispersed by ocean currents, and were likely to have adapted to changing temperatures and the other conditions. The effect of these environmental changes are probably reflected in the differences in the length of snout, maximum adult size and colour patterns that currently exist among populations. Reproduction in seahorses, with males brooding the eggs and producing highly advanced young, reinforces localisation. Of the few species with pelagic young, some are estuarine and rather restricted in distribution, and others coastal and wide-ranging within a region. Australian species are variously distributed along the continental coast, with more than one species usually found in any given area, but usually in different habitats. Despite this, no seahorses have been recorded from the southern-most part of Western Australia.

The unique morphology of seahorses is known even to the non-specialist. Likewise, their reproductive strategy, shared with other members of the syngnathid family, is familiar to most. Rather than males taking sperm to the eggs of females, as occurs in the vast majority of animals, female syngnathids take their eggs to the source of sperm, placing the eggs on or in the male's body for incubation. In seahorses and a few pipefishes, this involves a fully enclosed pouch in which the eggs are brooded, the male truly becoming pregnant. After three to four weeks a male seahorse gives birth to between 50 to 400 fully formed seahorses, depending on species (personal observation of aquarium-reared *H. breviceps*, *H. whitei* and *H. bleekeri*). Some temperate species have only a few large broods in summer months, but tropical species may reproduce more often, and breeding appears to coincide with the wet season or phases of moon which produce large tides and food for offspring.

Most species go through changes with growth, usually reflected in length of their snout, spines or tubercles, and colour. Males develop a brood-pouch well before maturity, often when only a few months old, and usually start breeding before becoming fully grown. Pelagic young of *H. abdominalis*, *H. bleekeri*, *H. hystrix*, *H. breviceps*, *H. tuberculatus* and *H. bargibanti* have relatively long snouts. The long snout eventually becomes very short in the adults of *H. abdominalis*, *H. breviceps*, *H. tuberculatus* and *H. bargibanti*, but in *H. bleekeri* and *H. hystrix* the snout remains long and may even lengthen further with age. Many species have young that settle at birth and they have a relatively short snout which usually becomes longer with

growth. The length of the snout relates to the form of prey targeting: different forces of suction are required for free swimming or crawling prey. A small seahorse feeding on plankton needs a long snout for success, whilst one clinging to the substrate can target crawling prey, and a short snout is more practical in negotiating complex, three-dimensional habitat, such as *Sargassum* or sponges. The general appearance of the seahorses in the environment is one of effective camouflage. A species that lives on vegetated or sponge reefs can adapt to the environment by changing colour or growing appendages. These adaptations are slow processes that occur when individuals move to different surroundings. This may be controlled through the food-chain, as most feed on small crustacea that in turn feed on the weeds or sponges which dominate most seahorse habitats. Some species can change colours rapidly, but usually these are temporary and relate to courtship. Although colour is highly variable within most species, there are diagnostic features in patterns and the range of colours, that can be useful in distinguishing between even closely related species. Species with long spines live on more open substrates and are often brightly coloured to match the soft-corals or sponges to which they cling. They are not found in dense weed or algae habitats, as the spines would probably foul and be a hindrance to movement. A good example is the rather smooth Western Australian *H. elongatus*, which apart from its reduced spines is virtually identical to the more tropical spiny *H. angustus*. I speculate that *H. angustus* and *H. elongatus* shared a spiny ancestral form and the spines reduced in the southern population as reefs became more algae dominant during the cooling periods.

Although seahorses have been of little interest to western society, except as curiosities or aquarium pets, dried seahorses have been used for medicinal purposes in the Orient as part of Traditional Chinese Medicine (TCM) for centuries. Whilst trade in dried seahorses uses millions of specimens it involves only a few species worldwide. Threats to the survival of any of the species collected in the wild are, in my opinion, generally overstated or sensationalised. Whilst many have a limited geographical range, commercial collecting is very localised with many areas remaining untouched. This includes Indonesia and Philippines, where most collecting takes place (Lourie *et al.*, 1999). Collecting specimens from the wild in Australia is not economical, except for supporting a small aquarium trade that is closely monitored. Since aquaculture is much more economical it is unlikely that catch rates will increase. Threats are more likely to come from the rapid increase of human populations which cause environmental pollution and habitat destruction in estuaries and coastal waters. Seahorses can be used as indicator species of ecosystem health and, because they are habitat-specific, can tell us much about how habitats differ or relate to each other. As shown here, species are more localised than previously thought, and preserving habitats is the most important factor in protecting seahorses for the future.

As information on the distribution of some Australian species is very limited, because they dwell at greater depths, distributions provided may only reflect a small portion of their true range. The author welcomes correspondence on *Hippocampus* species (syngnathiformes@zoonetics.com) which may contribute to our understanding of their biology.

Materials and methods

Descriptions of species are primarily based on specimens housed in collections of Australian institutions. Those taken from previous works are so acknowledged.

Institutions are abbreviated as follows:

- AMS Australian Museum, Sydney
- CSIRO CSIRO Marine Laboratories, Hobart
- MNHN Muséum national d’Histoire naturelle, Paris.
- NMV Museum Victoria, Melbourne
- NTM Museum and Art Galleries of the Northern Territory, Darwin
- QM Queensland Museum, Brisbane
- SAMA South Australian Museum, Adelaide
- WAM Western Australian Museum, Perth
- ZMB Universitat Humboldt, Museum fur Naturkunde, Berlin

Observations and photographs of species taken while diving, in aquariums, and based on freshly collected specimens were important in determining some of the species. Despite this, most photographs presented were taken from preserved material. A simplified terminology and the avoidance of abbreviations has been employed here for two reasons: 1, seahorses have unusual characters that many workers may not recognise, and 2, the unusual vertical posture and shape of seahorses may cause confusion when applying the terms “anteriorly”, “posteriorly”, “dorsally” and “ventrally” (see Fig. 1). Terminology used in the text are depicted in Figs. 1 and 2. Measurements are kept to the natural posture of the fish as shown in Fig. 3. Ridge and ring definitions follow Dawson, 1985.

Figures of type-material, male, female and juvenile stages are provided for each species where material was available for photography.

A pictorial key is provided for species of *Hippocampus* known to occur in Australia (Fig. 4). All species presented on a page of the key are listed together with their meristic values at the bottom of the page in the caption.

Morphology (Figs. 1, 2). The body of seahorses and other syngnathids is covered by series of bony segments each having a raised centre or edges, they together form rings across the body and ridges that run the length of the body. Where rings and ridges cross, the junctions normally rise and form tubercles or spines. Tubercles may become large in some species and have rugose tops. Spines may have rugose edges, and may be blunt or sharp. The absence, presence or size of spines or tubercles on the head and body, are often diagnostic features, but these may vary between different stages of a species or between the sexes. In general, juveniles are more spiny than adults and females are more spiny than males.

Trunk and tail ridges. Seahorses have 7 trunk ridges, 1 mid ventrally and 3 laterally on each side, and 4 tail ridges, 2 laterally on each side. Principal ridges (Fig. 3) are very similar among species. All trunk ridges originate on the first body ring but each one ends on different rings coinciding with the origin of the tail: superior ridges usually continue on to the first one or two tail rings, but the lateral ridge usually ends on the penultimate trunk ring.

Trunk rings. The first trunk ring starts where the neck-ridge divides laterally into the superior trunk ridges (see Fig. 1) and the last trunk ring is the ring on which the seven-

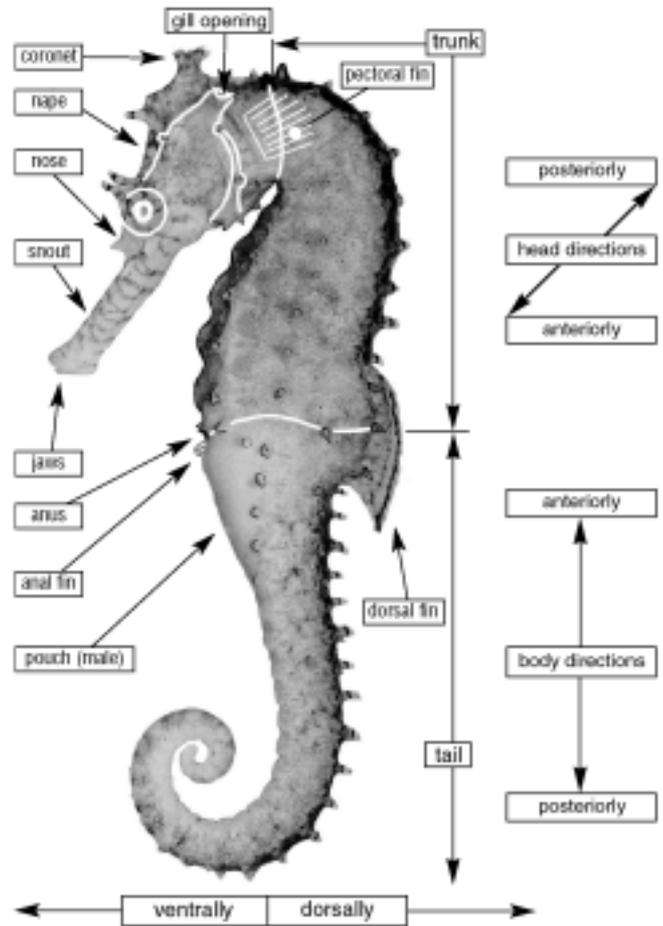


Figure 1. General morphology.

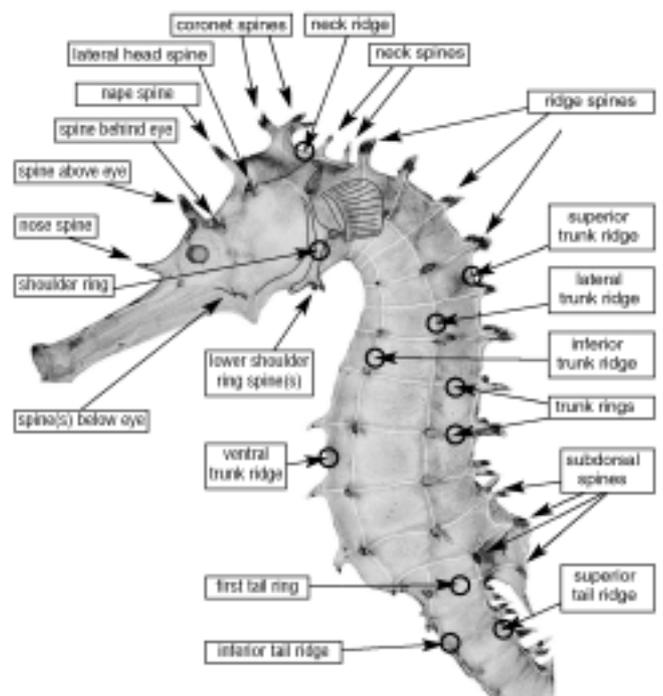


Figure 2. Spine, ring and ridge terminology.

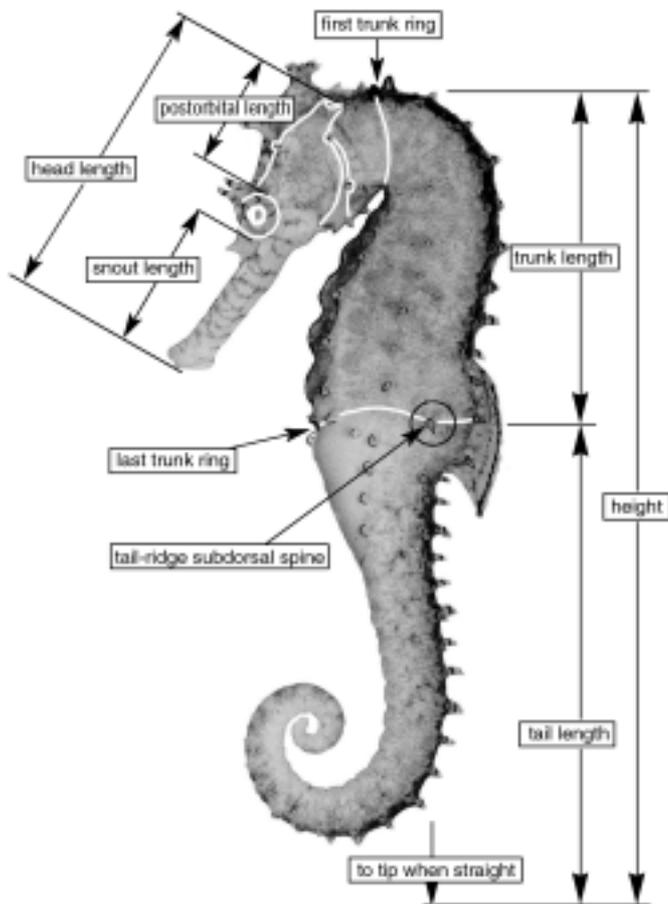


Figure 3. Measurements.

sided body changes to the four-sided tail. The anus is situated ventrally on the last trunk ring.

Subdorsal rings. The dorsal fin is usually based over a number of trunk rings and 1 or 2 tail rings. The rings are termed as subdorsal and presented as 3+1, when the base reaches over three trunk rings and one tail ring. In variable species the origin may range in front or behind a certain trunk ring and the rings are presented as a range (e.g., 1–2, 2–3).

Tail rings. The first tail ring follows the last trunk ring. The superior tail ridge is usually preceded by a spine on the last trunk ring below the superior trunk ridge running along the base of the dorsal fin onto the first tail ring. The last few tail rings are often difficult to count, especially when covered with thick skin, and are best judged by the spacing of the preceding rings, assuming the same rate of proportional reduction posteriorly. The posterior part of the tail is usually rolled tightly near the tip, where rings are the smallest. The resulting skin folds on the inside are easily mistaken for rings and may cause small errors in counts. In most cases the tail-ring count is not useful in differentiating closely related species.

Tubercles. Tubercles are raised nodes at the intersections of rings and ridges. They are usually shaped like a small pimple or with broad, rugose tips. Taller tubercles with rounded tops resemble low, blunt spines. These are often present as spines in juveniles, but usually become blunt and relatively smaller with growth.

Spines. Spines are essentially extended and better developed tubercles. They range in size from small to moderate in length, in shape from thorn-like to long and slender, and from blunt to pointed at the tip. Tips or edges are sometimes rugose. Males are usually less spiny than females and juveniles are more spiny than adults. In most cases males have reduced spines on the superior trunk rings, but these can be long in females. In long-spined species, deformities are common with doubled or even tripled spines angled randomly. Occasionally spines that may be of diagnostic value are broken, regrown or missing due to damage from predators or the methods of capture.

Head spines. The lower shoulder-ring spine is termed “cheek-spine” by some authors, but true cheek spines are located below the eye. Because of this confusion the term is omitted here and “spines below eye” is employed in referring to spines in the cheek region.

Subdorsal spines. The posterior and anterior parts of the superior trunk and tail ridges, respectively, overlap each other below, and for the length of the dorsal-fin base; spines on the intersection of superior ridges and ring joints (nodes) in this region are termed “subdorsal spines”. The superior trunk ridge ends below the dorsal fin and often bears several enlarged spines on the subdorsal rings, usually one per ring. The superior tail ridge arises on the trunk, below the superior trunk ridge, and may or may not bear spines on each ring below the dorsal-fin base, depending on the species. Usually, the intersection of the tail ridge with the second subdorsal ring has an enlarged spine, and intersections of the tail ridge with the first or third subdorsal rings occasionally bear smaller spines. When species have a long dorsal-fin base, there may be one or two additional intersections posteriorly. The subdorsal-spine counts are presented as follows: number of superior trunk ridge spines separated by a diagonal (/) from the superior tail ridge spine formula. The number of superior trunk-ridge subdorsal-spines is represented by a value, and a variable number by a range of values (e.g., 3–4). The superior tail-ridge subdorsal-spine formula comprises the values for presence, absence and position of superior tail-ridge spines per subdorsal intersection of the superior tail ridge. The presence of a spine is represented by 1, the absence of a spine by 0, a small or poorly developed spine by 0.5, and variable presence is indicated by a range (e.g., 0–1 or 0–0.5). Values are separated by commas (e.g., 0,1,0). The presence of successive spines is represented by separate numbers (e.g., 1,1) and successive absence by naughts (e.g., 0,0). A typical count would be shown as 0,1,0, or 0,1,1 (no spine on 1st node in both examples, only one spine on the 2nd node in former, and spines on 2nd and 3rd nodes in latter), but in variable species may appear as 0,1,0–1 (3rd node without or with spine) or 0–0.5,1,0–1,1 (1st node without or with small or poorly developed spine; 3rd node without or with spine; the last value representing 4th node with spine).

Fin rays. Fin-ray counts provided represent the number of rays having a single base. Rays split at the base are rare in seahorses and were counted as one. In some specimens, fins were observed that may have been damaged at an early stage in life and may have re-grown in an aberrant way so that they included additional rays or missing parts. An attempt was made to adjust counts when abnormalities were recognised. They usually manifested themselves as an irregular spacing between rays, with several rays crowded at the base, or by the presence of an unusually wide space between the rays. Differences in pectoral-fin counts between the left and right sides are common and variations by one or even two rays were regarded as normal.

Measurements (Fig. 3). *Height.* A straight-line measurement from upper surface (ignoring spines) of first trunk ring, to tip of tail as shown in Fig. 3. Coiled tails were either straightened or replicated by bending a thin metal wire into the shape of the tail, and straightening it for measurement. *Trunk length.* Measured as for “height” from upper surface of first trunk ring, vertically downward to last trunk ring, employing tail-ridge sub-dorsal spine (usually present and enlarged) at the last trunk ring as a termination point. *Trunk depth.* Measured perpendicular to trunk axis, its maximum dorsoventral depth. It is not shown in Fig. 3, as this measurement is at different sections of the trunk, depending on species, sex or age. *Head length.* Distance from tip of snout to gill opening. *Postorbital length.* Distance from rear of orbit to gill opening. *Snout length.* Distance from tip of snout to front of orbit. *Snout depth.* Minimal depth of snout. *Total length.* Combined length of head and height, measured by bending a metal wire in a similar fashion to that described for “Height”. Though not recorded for this study, values are occasionally reported when quoting published data (abbreviated as *TL*). *Standard length.* Length of fish from tip of snout to posterior edge of hypural (joint between caudal skeleton and caudal fin). This is a standard measurement for the length of fishes with caudal fins (abbreviated as *SL*) but, except for Lourie *et al.* (1999), is normally not used for seahorses.

Although standard ichthyological terminology has been employed wherever practical, because of the extraordinary morphology in these fishes, additional terms as “neck” or “shoulder” are employed. Whitley (1958) used “shouldering” for the ridge-like feature that runs in front of the pectoral-fin base and the term is retained here, along with several of his other descriptive terms. Because of the head position, the direction “anteriorly” and “posteriorly” (Fig. 1) can be confusing for seahorses. The angle of the head to the body can vary greatly among species. In some species the heads of adults are strongly angled down, whilst the heads of pelagic young are almost in line with the body. When used in reference to the head, anterior is directed towards the tip of the snout, while posterior is toward the gill-opening. For the rest of the body, posterior is orientated toward the tip of the tail, while anterior is directed toward the back of the head. The term “nose” refers to the nasal area.

Material examined. Since most specimens were registered under different names, only those specimens identified as the actual species are listed in the descriptions. Specimens examined from outside Australia, representing species not included in this revision, are not listed and only remarked on when relevant.

Genus *Hippocampus* Rafinesque

Hippocampus Rafinesque, 1810: 18. Masculine. Type species *Syngnathus heptagonus* Rafinesque, 1810 (= *Syngnathus hippocampus* Linnaeus 1758).

Macleayina Fowler, 1907: 426. Feminine. Type species *Hippocampus bleekeri* Fowler, 1907.

Farlapiscis Whitley, 1931: 313. Masculine. Type species *Hippocampus breviceps* Peters, 1869.

Jamsus Ginsburg, 1937: 584. Masculine. As subgenus of *Hippocampus*. Type species *Hippocampus regulus* Ginsburg, 1937.

Hippohystrix Whitley, 1940: 414. Feminine. Type species *Hippocampus spinosissimus* Weber, 1913.

Diagnosis. Body encased in ring-like rigid plates; body usually maintained in vertical posture with head bent forwards and downwards in sharp angle, usually forming an angle of less than 90° to body in adults; snout tubular, with small mouth at tip, jaws lacking teeth; tail prehensile; males with brood pouch below anterior part of tail; trunk heptagonal in cross section, each side with superior ridge dorsally, lateral ridge along upper side, and inferior ridge along lower side, as well as single mid-ventral ridge (sometimes termed “keel”); tail four-sided with two superior ridges dorsally, and two inferior ridges ventrally; trunk usually with 11 rings, but occasionally with 12 or 13 rings; tail usually with 30 or more rings; dorsal and pectoral fins moderately large, usually with about 10–20 rays; anal fin small and occasionally absent in adults; ventral and caudal fins absent.

Remarks. Only a single genus is presently recognised for this highly diverse group of fishes. The absence of a clear separation between any of the various forms, based on external features, makes it difficult to justify the recognition of one or more of the current synonyms at the generic level. Although there appear to be distinct groups, such as “smooth” and “spiny” forms, additional characters need to be investigated prior to any taxonomic splitting of the genus, if it is indeed warranted. Two of the species treated here are only known from single specimens in Australian waters. *Hippocampus jugumus* is a very distinctive species from Lord Howe I. but no additional material is known. A single specimen of *H. kampylotrachelos* was found on Ashmore reef, which is well away from the Australian mainland. This species is known to occur in Indonesian waters from Java to the Timor Sea. As *H. semispinosus* was reported only as coming from the “Timor Sea”, it is unclear whether the paratype came from Indonesian or Australian waters. The tiny *H. spinosissimus* is known only from 2 specimens trawled at a depth of 70 m depth in Sapeh Strait which runs east of Komodo, Indonesia. Occurrence off this species in Australian waters is unconfirmed. Since the name is commonly used for spiny species in Australia, its description, translated from the original German publication, is included. It may be unique to the Komodo region as a few other species of fish (e.g., *Apogon komodoensis* Allen, 1998) appear to be endemics there. The occurrence of *H. hystrix* in Australian waters is highly likely even though no specimens were found in the collections of the Australian institutions. This species occurs from Japan to Bali, Indonesia, along the Wallace’s Line, and eastward along the Papuan New Guinea coast, ranging to at least New Caledonia in the Coral Sea. As this is one of the most widespread species of the genus, expatriates transported by current during the pelagic stage can be expected on the north coast or as inhabitants of the inner parts of the Great Barrier Reef.

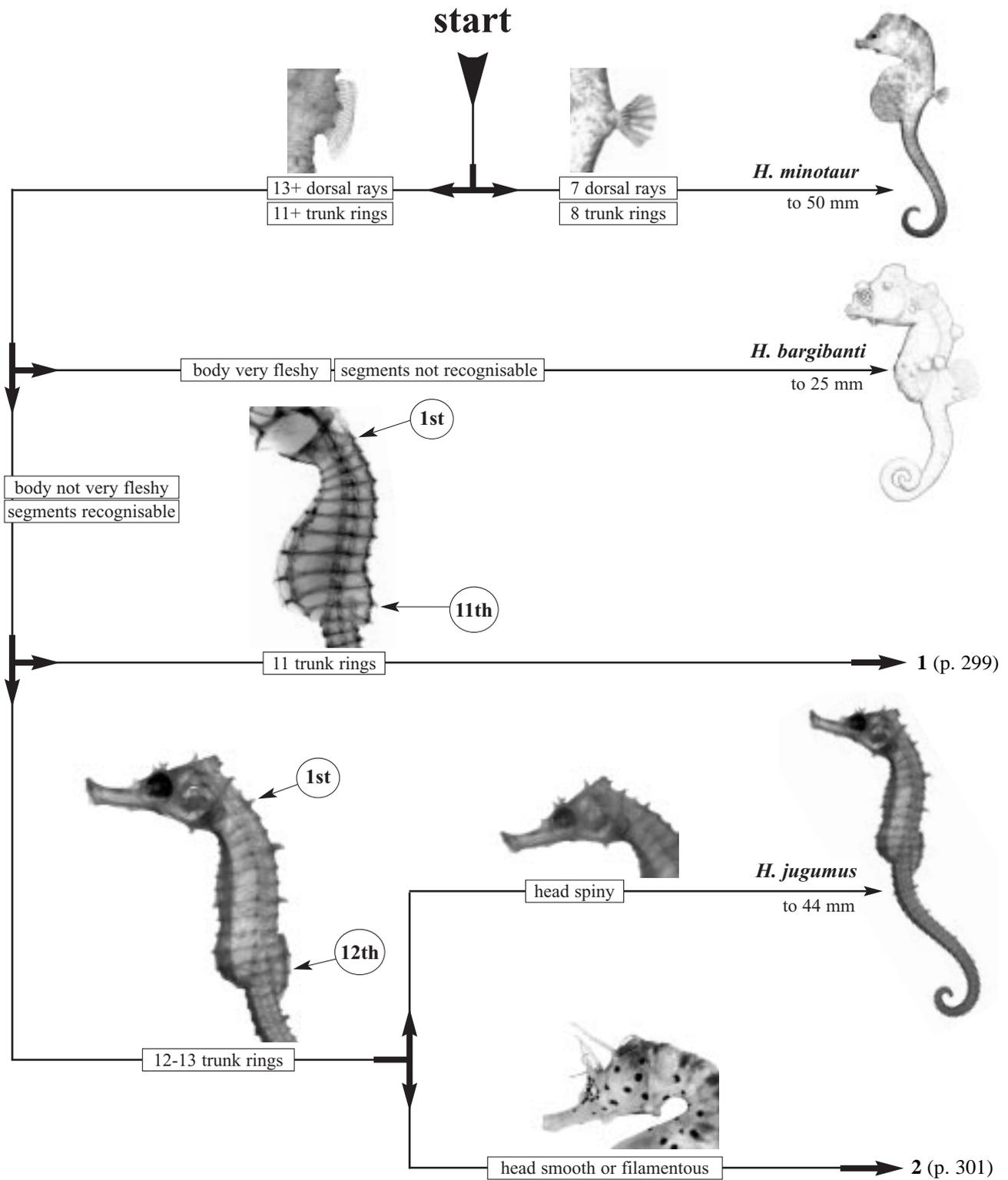


Figure 4. Key to Australian *Hippocampus* species. *Hippocampus minotaur* (p. 304), D7, P11, R8+41, southeastern Australia; *H. jugumus* (p. 306), D20, P16, R12+37, known only from a single Lord Howe I. specimen, height 44 mm; *H. bargibanti* (p. 305), D13–15, P10, R11–12+31–34, Qld and west Pacific.

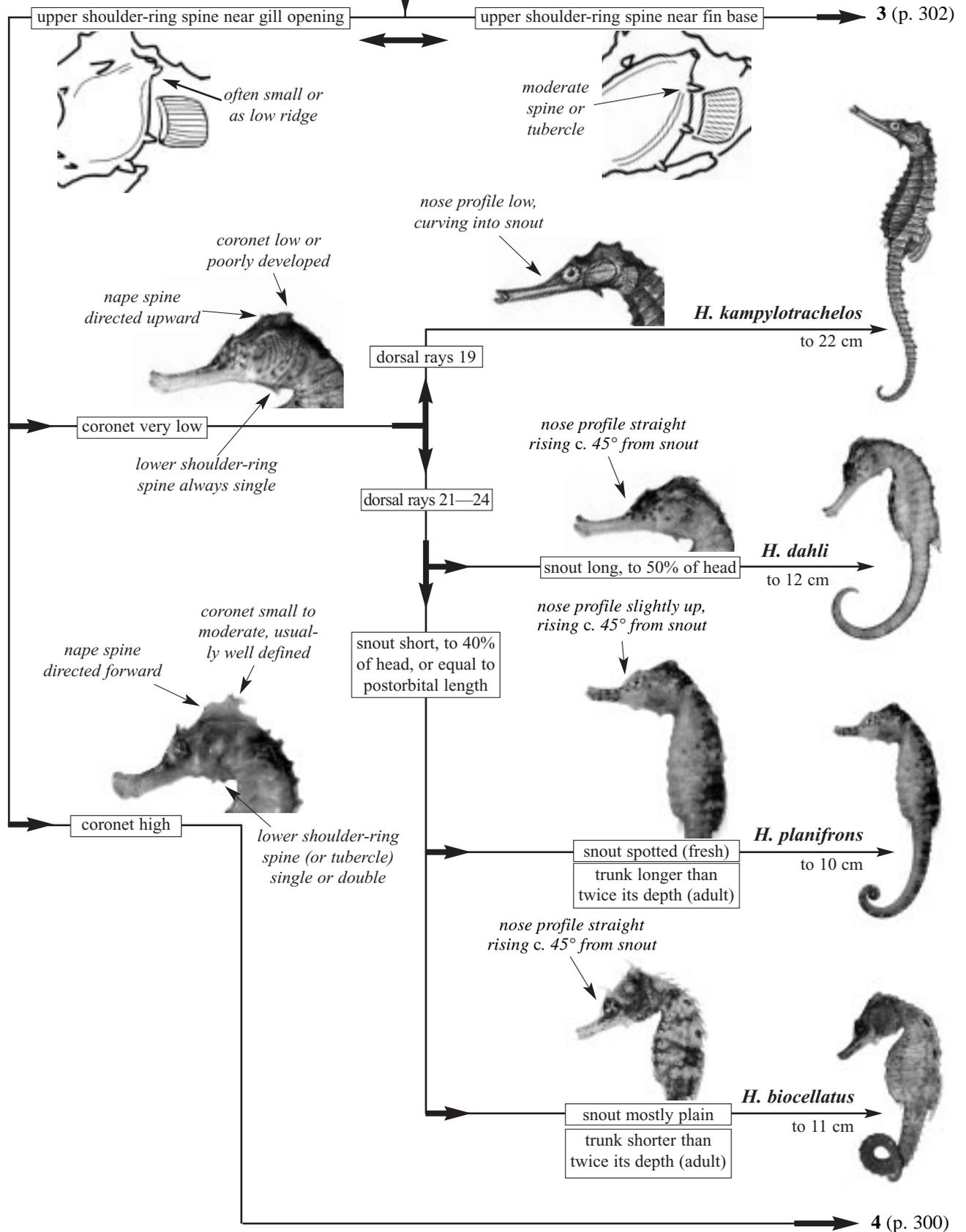


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus kamylotrachelos* (p. 307), D19, P16, R11+39, Indonesia and northwestern Australia; *H. dahli* (p. 308), D21–22, P17–18, R11+37–40, Qld and NT; *H. planifrons* (p. 310), D23–24, P18–19, R11+37–38, WA; *H. biocellatus* (p. 311), D22–23, P16–18, R11+36–38, Shark Bay, WA.

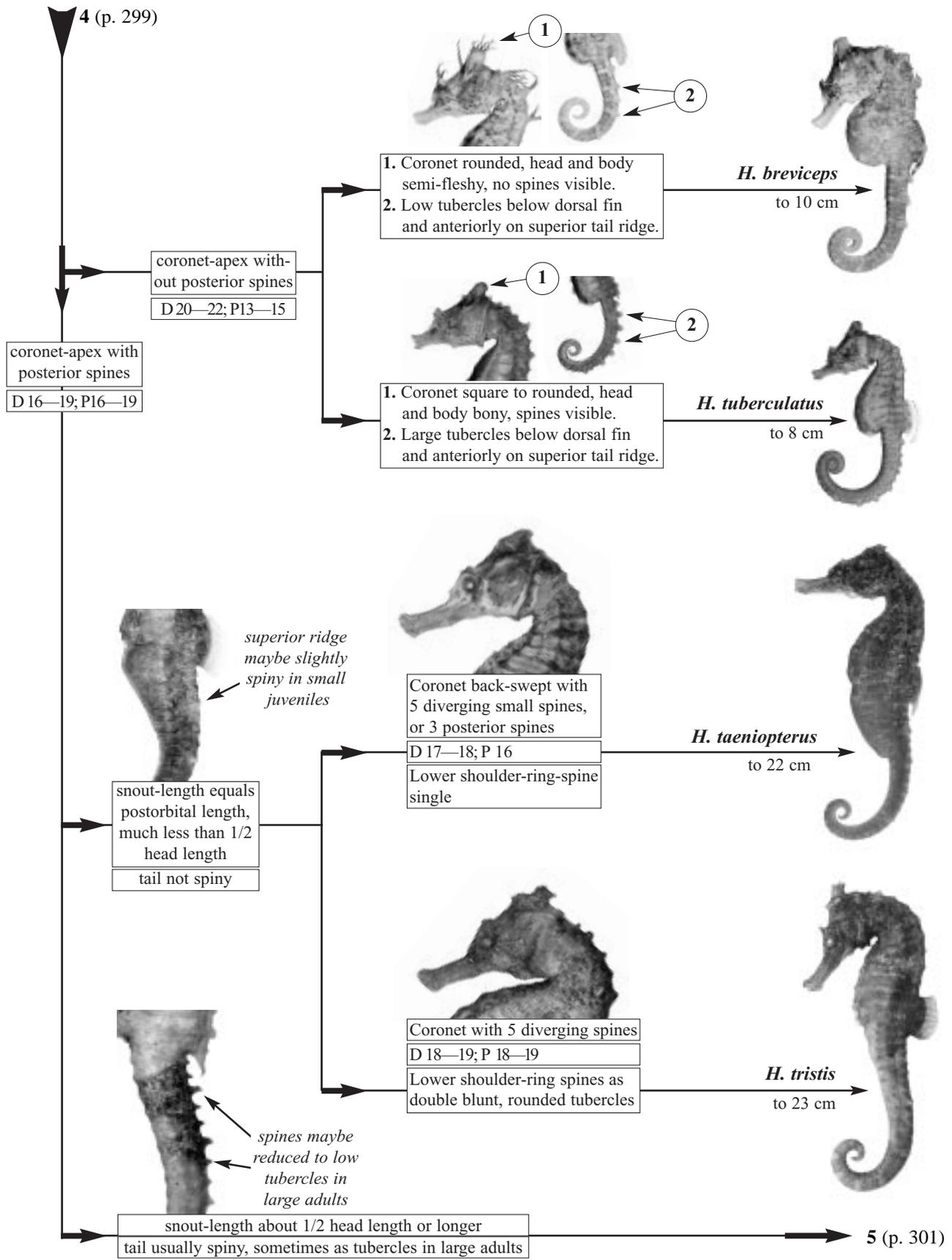


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus breviceps* (p. 312), D21–22, P13–14, R11+38–42, SA, Vic., Tas.; *H. tuberculatus* (p. 313), D20–21, P14–15, R11+36–37, WA; *H. taeniopterus* (p. 314), D17–18, P16, R11+34–35, NT, Qld and west Pacific; *H. tristis* (p. 316), D18–19, P18–19, R11+35–37, southern Qld, northern NSW and Lord Howe I.

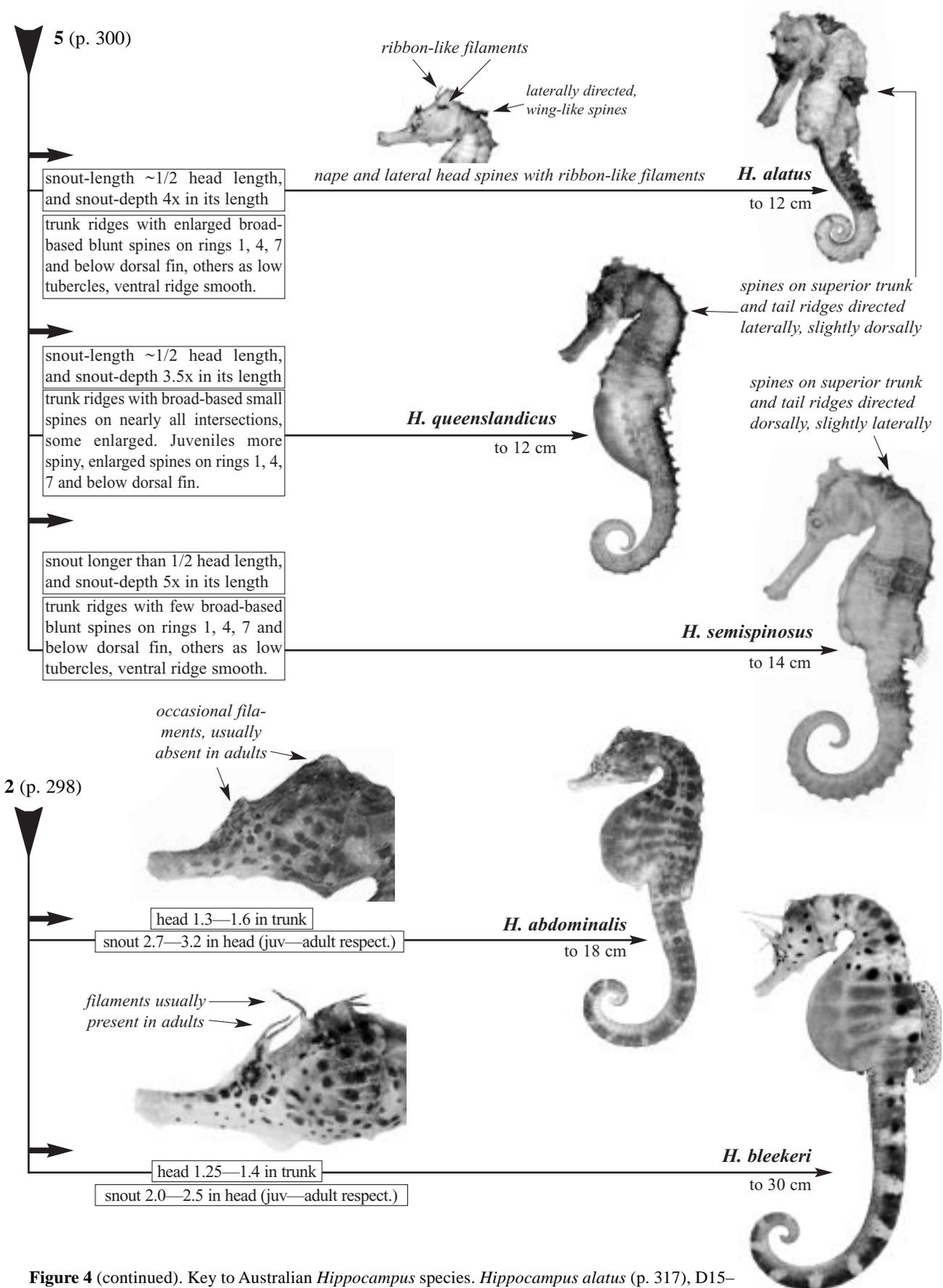


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus alatus* (p. 317), D15–18, P16–18, R11+34–36, northern Australia; *H. queenslandicus* (p. 319), D17–18, P16–19, R11+35–36, Qld; *H. semispinosus* (p. 320), D18, P16–17, R11+35–36, southern Indonesia; *H. abdominalis* (p. 322), D25–28, P15–16, R12–13+44–45, NSW and NZ; *H. bleekeri* (p. 323), D27–30, P14–16, R12–13+44–48, SA, Vic. and Tas.

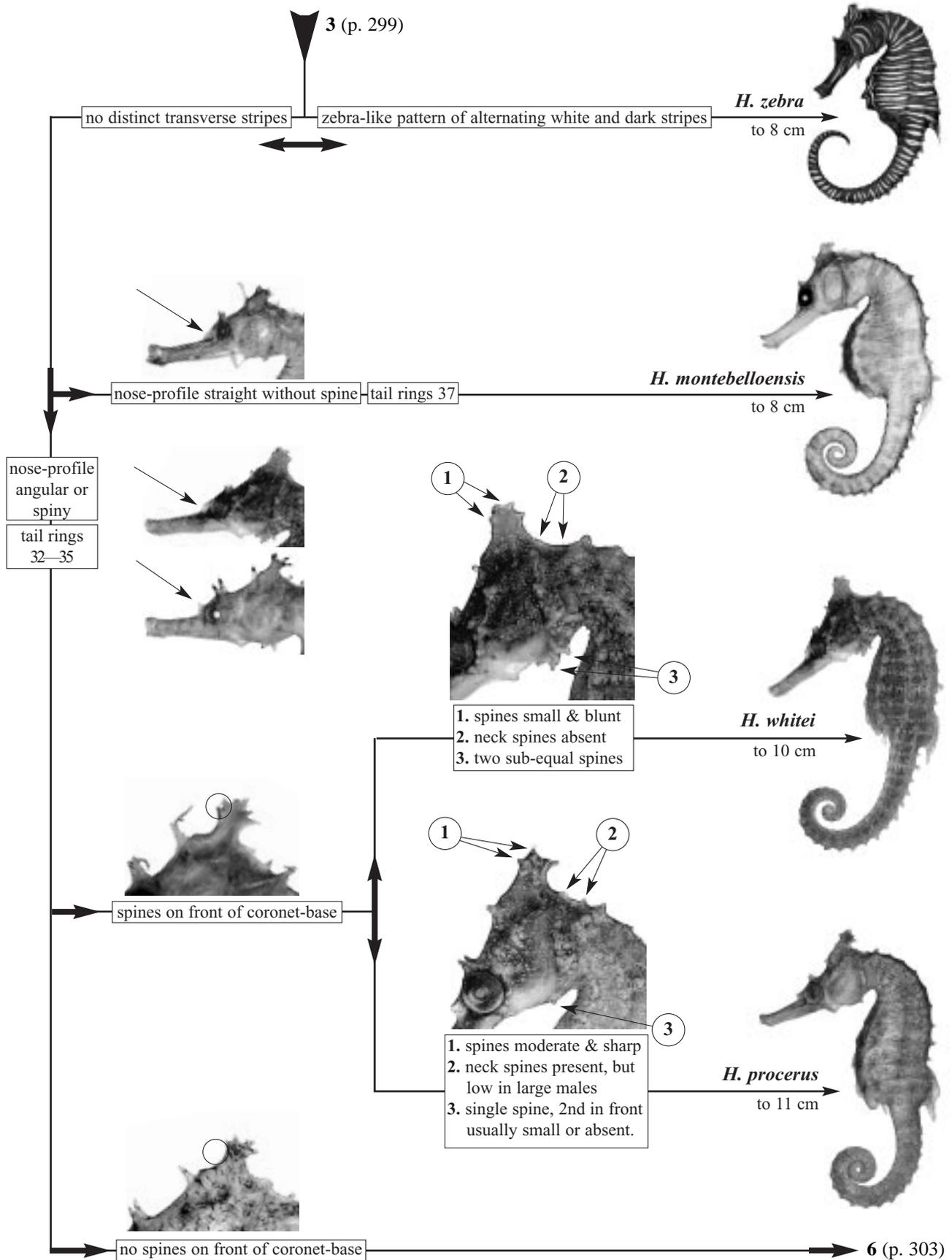


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus zebra* (p. 325), D17–18, P15–16, R11+37–39, Qld; *H. montebelloensis* (p. 326), D18–19, P15–16, R11+37, WA; *H. whitei* (p. 327), D16–17, P15–17, R11+33–34, NSW; *H. procerus* (p. 328), D17–19, P16–18, R11+34–35, Qld.

6 (p. 302)

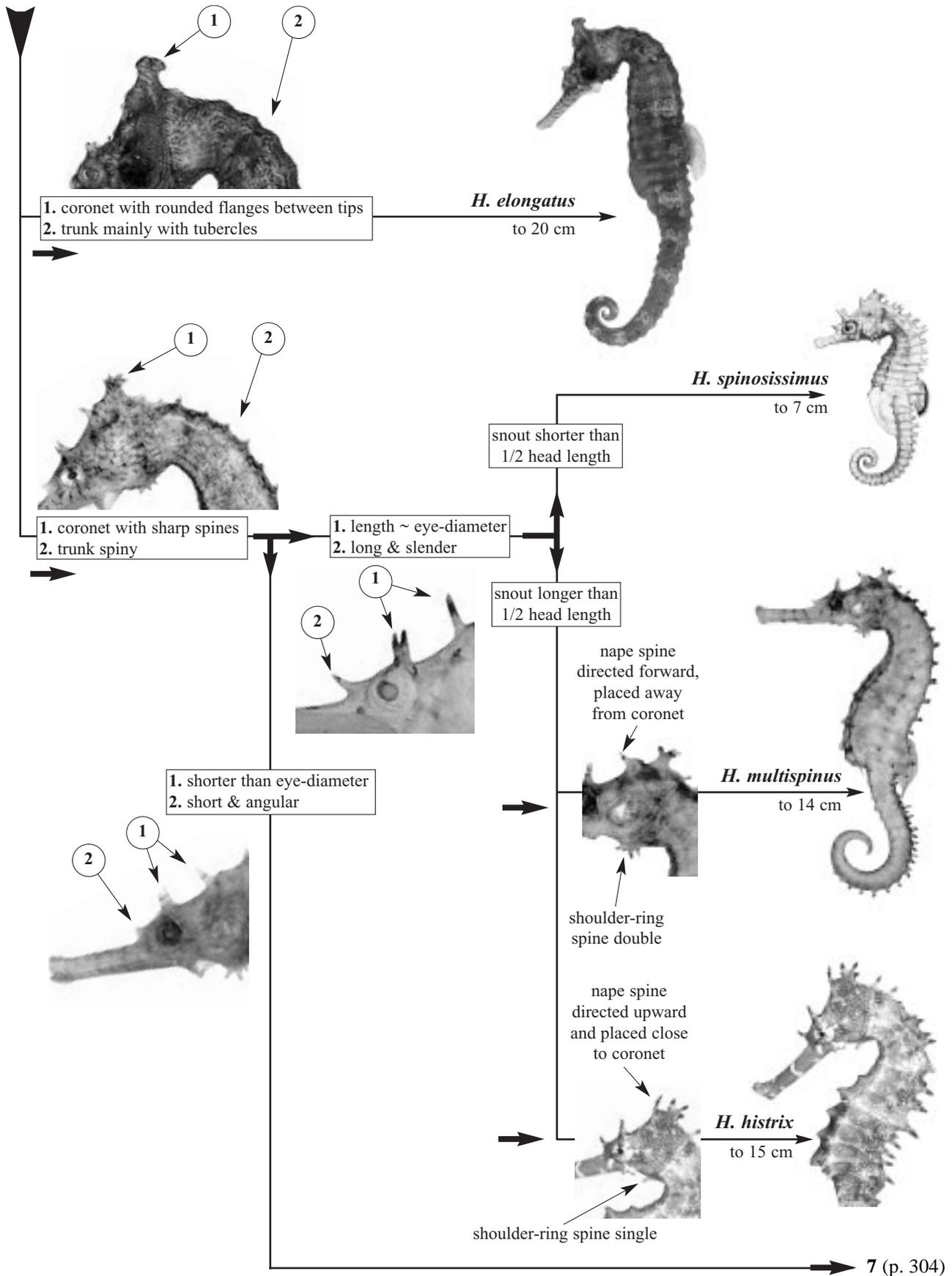


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus elongatus* (p. 329), D18, P17–18, R11+33–34, southern WA; *H. spinosissimus* (p. 330), D17, P15, R11+34, Indonesia; *H. multispinus* (p. 331), D18, P16–18, R11+30–35, northern Australia; *H. histrix* (p. 333), D17–19, P17–18, R11+33–34, west Pacific.

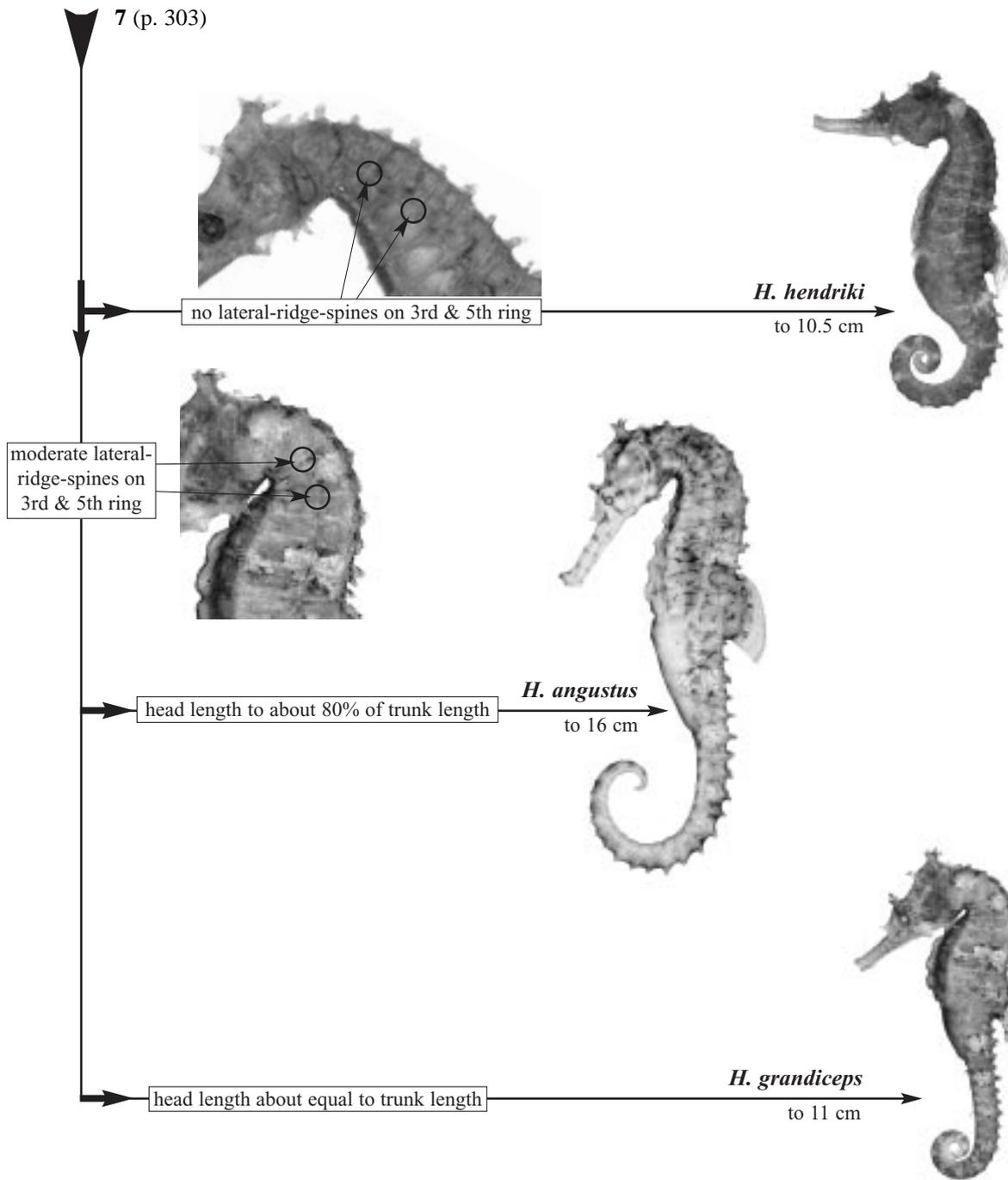


Figure 4 (continued). Key to Australian *Hippocampus* species. *Hippocampus hendriki* (p. 333), D17–18, P16–17, R11+34, northern Qld; *H. angustus* (p. 335), D18–19, P15–20, R11+31–32, WA; *H. grandiceps* (p. 336), D18, P17–18, R11+32–33, Gulf of Carpentaria, Qld.

Hippocampus minotaur

Bullneck Seahorse

Fig. 5

Hippocampus minotaur Gomon, 1997, off Eden, New South Wales, Australia.

Diagnosis (after Gomon, 1997). Dorsal-fin rays 7; pectoral-fin rays 11; anal-fin rays 4; no exaggerated constriction

dividing head and body; head and body extremely fleshy without recognisable bony segments, spines or other ornamentation; ventral trunk ridges undeveloped. *Fin rays*: dorsal 7; pectoral 11; anal 4. *Rings*: subdorsal obscured; trunk 8; tail 41. *Spines or tubercles*: head and body fleshy without recognisable bony segments, spines or other ornamentation. *Lateral line*: obscured. *Coronet*: appearing as a smooth raised hump. *Colour in life*: unknown. *Colour in alcohol*: mostly cream, speckled with tiny brown dots having cream centres or plain brownish overall.

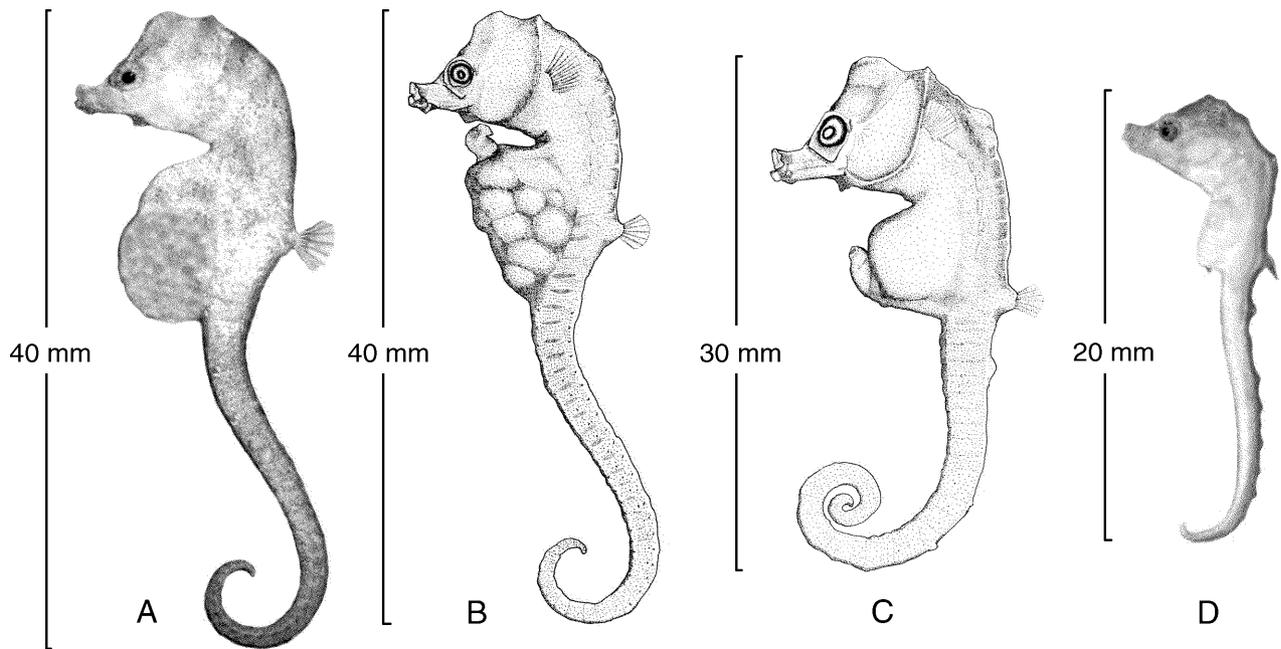


Figure 5. *Hippocampus minotaur*. A & B, holotype, ♂, NMV A192, Eden, NSW. C, paratype, ♀, AMS IA3509, coast of NSW. D, paratype, juvenile, NMV A14161, Cape Patterson, Vic. A—pouch modified digitally; B & C—after Gomon.

Measurements (after Gomon, 1997). The holotype (paratype measurements in brackets) has a total length of 48.7 mm (19.2–52.6). Head length 16.4% (16.7–21.3) *TL*; snout very short, 29.3% (28.0–31.1) *HL*; trunk short, 31.0% (31.3–36.4) *TL*.

Distribution (Fig. 6). Southern New South Wales to the Bass Strait region in a depth range from about 70 to 110 m. Only known from the type material.

Remarks. Readily distinguished from other congeners by the short-based dorsal fin with just 7 rays and features listed in the diagnosis. Specimens reported by Gomon (1997) as being taken in environmental monitoring surveys off Wollongong appear to be lost. Although no details of the specimens are known, they are more likely to represent an undescribed species of pipehorse *Idiotropiscis* sp. The latter

is a small seahorse-like species that ranges from the Sydney region to Jervis Bay (Kuiter, ms in preparation).

Material examined. HOLOTYPE: NMV A192, ♀, 48.7 mm *TL*, off Eden, New South Wales, depth 35–40 fm, Danish seine trawl, R. Slack-Smith, 30 Dec 1960. PARATYPES: AMS IA3509, ♀, 42.2 mm *TL*, NSW coast, trawled, K. Möller, registered 27 Jun 1927. AMS IA3560, ♀, 52.6 mm *TL*, 8 mi E Eden, NSW, depth 50–60 fm, H. Howell, registered 7 Oct 1927. NMV A14161, juvenile, 19.2 mm *TL*, Bass Strait, 38 km SW Cape Patterson, 38°56.4'S 145°16.6'E, 70 m, fine sandy bottom, RV *Tangaroa*, R. Wilson, 12 Nov 1981.

Hippocampus bargibanti

Pygmy Seahorse

Fig. 7

Hippocampus bargibanti Whitley, 1970. New Caledonia, Nouméa.

Diagnosis (after Gomon, 1997). Dorsal-fin rays 13–15; pectoral-fin rays 10; anal fin absent in adults; very weak constriction separating head and body; head and body extremely fleshy without recognisable bony segments, body ornamentation in the form of prominent bulbous tubercles in adults; ventral trunk ridges poorly developed. *Fin rays*¹: dorsal 13–15; pectoral 10; anal fin absent in adults. *Rings*¹: subdorsal obscured; trunk 11–12; tail 31–34. *Spines or tubercles*: head and body extremely fleshy without recognisable bony rings, spines or tubercles not visible and become overgrown with soft tissue, forming large bulbous or wart-like lumps in adults. *Lateral line*: obscured. *Coronet*: hump-like. *Colour in life*: pale grey, bluish grey, yellow or pink with yellow, orange to red lumps; body striated in adults. *Colour in alcohol*: mostly cream.

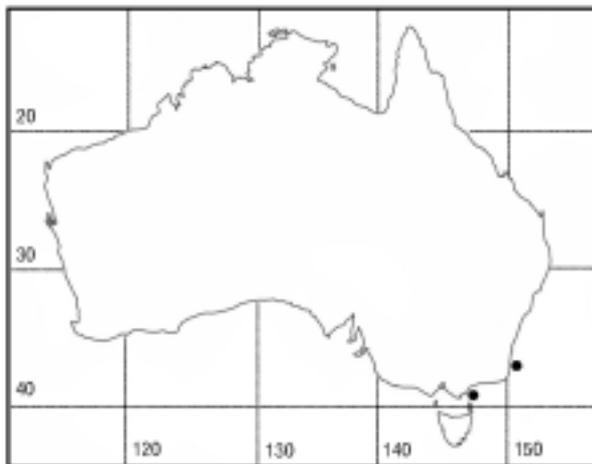


Figure 6. *Hippocampus minotaur*. Collection sites of specimens examined.

¹ Counts after Gomon (1997, fig. 4), and Lourie *et al.* (1999).

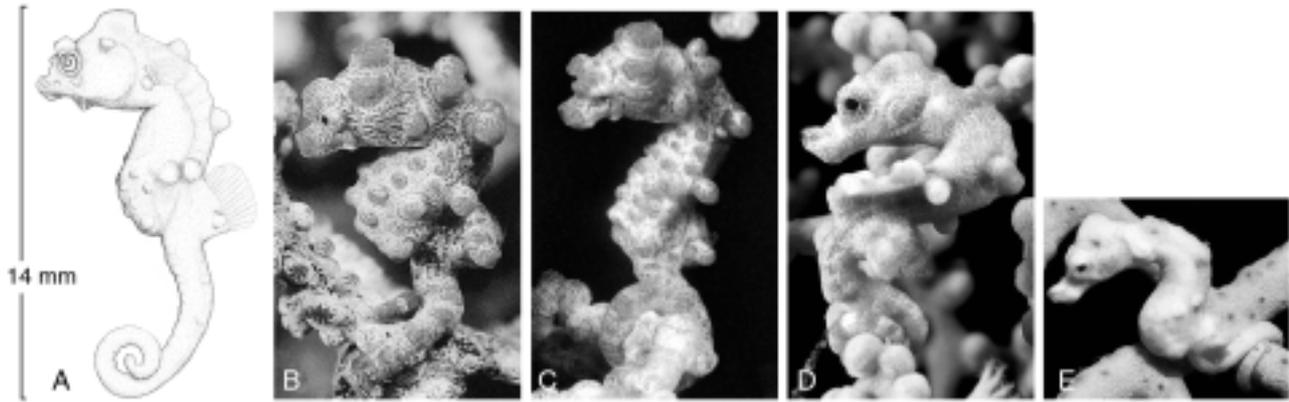


Figure 7. *Hippocampus bargibanti*. A, lectotype, ♀, AMS I15418-002, Nouméa, New Caledonia (after Gomon, 1997). B, ♀, Sulawesi, Indonesia. C, ♂, Sulawesi, Indonesia. D, maturing ♂, showing striations on body, Sulawesi, Indonesia, photo by Tony Wu. E juvenile, probably young ♀, showing wart-like development on the principal points of the trunk and head, Sulawesi, Indonesia, photo by Roger C. Steene.



Figure 8. *Hippocampus bargibanti*. Distribution in Australia, based on localities of specimens photographed underwater.

Measurements. The five specimens in the Australian museum collection range in size from 19.5–24.2 mm *TL*. The largest specimens seen in the wild were estimated as 20 mm in height and about 30 mm in total length.

Distribution (Fig. 8). Since its discovery in Nouméa, divers-photographers have found *Hippocampus bargibanti* in many places between Australia and Japan. It is now known from Bali, and both north and south Sulawesi in Indonesia, Ogasawara Is of southern Japan, Papua New Guinea and Solomon Is. It was first discovered in Australia by Alan Power in the Capricorn region, soon after it was described. Since then, it has been photographed in several locations on the northern Great Barrier Reef. *Hippocampus bargibanti* is usually found in depths between 30 and 60 m, but occurs as shallow as 10 m in Indonesia and the Solomon Is.

Remarks. This is a remarkable, small species that has adapted to live on gorgonian corals, on which it feeds and spends its adult life. Young are pelagic and may disperse over great distances. Post pelagic young settle on a variety of differently coloured gorgonian species at various depths, quickly adopting a similar colour and changing shape. In shallow water where gorgonians are diverse, young *H. bargibanti* vary in colour depending on the species to which

they attach, and may differ completely from adults that seem to prefer the gorgonian *Muricella*, usually occurring in depths of 20 m or more. Those settling in the shallower depths can range from yellow to brown or red, and have warts that match retracted gorgonian polyps in size. Fish appear to adapt to their hosts by eating their hosts' tissue. These seahorses become perfectly camouflaged, taking on the colour and developing the polyp-like lumps of their host, in addition its skin reacts by growing, as if following an encoded message in the host flesh that they ingest. Young settling on the deep-water gorgonian *Muricella* have the same colours as most adults, and those in the shallows are likely to move to deeper water and change colours after having first settled on different coloured gorgonians. The occasional young that does not match its host in colour and shape, may represent an individual that only recently moved to a new host. Gomon (1997) provided a detailed description of the species.

Type material. LECTOTYPE: AMS I15418-002, ♀, 20.9 mm *TL*, Nouméa, New Caledonia, depth 30 m, collected with gorgonian coral *Muricella* sp., Georges Bargibant, Jul 1969. PARALECTOTYPE: AMS I15418-001, ♀, 19.5 mm *TL*, Nouméa, New Caledonia, depth 30 m, collected with gorgonian coral *Muricella* sp., Georges Bargibant, Jul 1969.

Hippocampus jugumus n.sp.

Collared Seahorse

Fig. 9

Hippocampus histrix (non Kaup) Whitley & Allan, 1958: fig. 6-3.
Hippocampus sp. B, Allen *et al.*, 1976.

Type material. HOLOTYPE: AMS IA2424, height 44 mm, ♀ (?), Lord Howe Island, off New South Wales, 31°31'S 159°05'E, collected by A. McCulloch, 1925.

Diagnosis. Dorsal-fin rays 20; pectoral-fin rays 16; trunk rings 12; tail rings 37; subdorsal spines 4/0,1,1,1,1; nose spine moderately large, height about equal to pupil diameter; double spine above eyes moderately long, slightly longer than pupil diameter; lateral head spine double and large; coronet slightly raised; gill openings extending upwards,

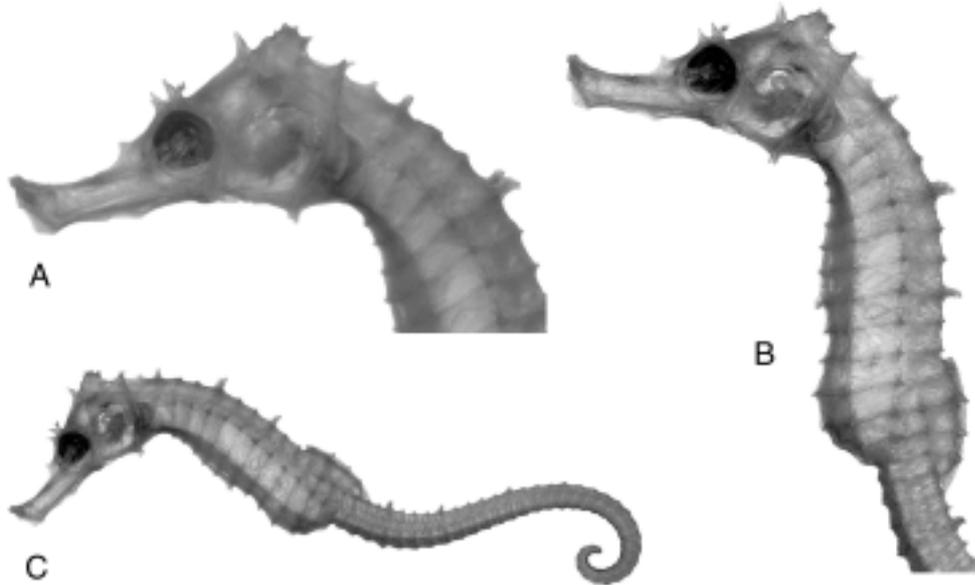


Figure 9. *Hippocampus jugumus*. Holotype, AMS IA2424. A, head; B, head and trunk; and C, entire specimen.

almost joined at neck ridge; shoulder rings confluent over neck-ridge forming continuous collar.

Description. Head small, c. 50% of trunk length; snout short, length about equal to postorbital length; dorsal fin with 20 rays, its base over 3 trunk and 2 tail rings; pectoral-fin rays 16; trunk rings 12; tail rings 37; long double spine above eyes; slightly larger double lateral head spine, pointing outwards; nape spine of moderate length, perpendicular to forehead; spine behind eye of moderate length; 2 separate spines below eye; 2 moderately large spines on shoulder ring, upper spine at level of last pectoral-fin ray, and lower spine at ventral extent of ring, directed perpendicular from the curve; coronet slightly raised with 6–7 short spines diverging in various directions; neck ridge with small spine immediately behind shoulder ring and one at posterior end; superior trunk ridge with enlarged blunt spines on 1st, 4th, 7th and 11–12th rings; lateral trunk ridge with small spine on each trunk ring apart from the first; inferior trunk ridge similarly with small spine on each trunk ring apart from the first; ventral trunk spines small, directed downwards, and mainly on last few rings; subdorsal spines 4/0.4; superior tail ridge spines well developed anteriorly, except on first ring, gradually reducing in size, with enlarged spines on 5th and 9th rings bearing dermal flaps; inferior tail ridge continuous with inferior trunk ridge, spine on each ring gradually reducing in size to 9th tail ring; lateral line with pores visible to about 24th tail ring; gill-openings extending upwards nearly to top of neck-ridge, the latter narrowly separating the two. *Lateral line*: not detected. *Colour in life*: unknown. *Colour in alcohol*: plain light brown.

Distribution. Only known from a single specimen collected at Lord Howe I.

Remarks. This species is named *jugumus*, derived from the Latin *jugum*, meaning yoke, in reference to the yoke-like ridge formed by the shoulder rings joined over the nape. *Hippocampus jugumus* is unusual in having a the high

number of trunk rings, a yoke-like shoulder ring, gill-openings reaching upwards to the neck ridge, and double-spines on the head. The specimen may be immature, but no other nominal species that might occur in the area could be linked, and it does not resemble any other Indo-Pacific species with regard to the full suite of diagnostic characters. Nothing is known about the history of the holotype. The fins are held stiffly against the body, suggesting it may have been dried before being preserved. This is typical of beach-washed specimens. Judging by the broad angle of the head to the body it may be pelagic, a feature that is found in the pelagic stages of *H. abdominalis* and *H. bleekeri*. It appears to have no close relatives.

Hippocampus kampylotrachelos

Smooth Seahorse

Fig. 10

Hippocampus kampylotrachelos Bleeker, 1854b, Priaman, Sumatra, Indonesia.

Hippocampus trimaculatus (non Leach) Lourie *et al.*, 1999, in part.

Diagnosis. Dorsal-fin rays 19; pectoral-fin rays 16; tail rings 39; dorsal profile of head evenly concave to tip of snout; nose-profile without spine and gradually curving onto snout with no obvious inflection; subdorsal spines on superior trunk ridge not greatly enlarged; subdorsal spine on second node of superior tail ridge enlarged, without rings on either side. *Fin rays*: dorsal 19; pectoral 16; anal 4. *Rings*: subdorsal 2 + 1; trunk 11; tail 39. *Spines or tubercles*: subdorsal 3/0,1,0, lower spine enlarged and obvious (see Fig. 10A); small spine above eye, directed back and outwards; nose ridge slightly raised, spine absent; nape spine small, directed upward; small spine behind eye; low double spines below eye; upper shoulder-ring spine appearing as slightly raised ridge beside gill-opening; tubercle of moderate size on shoulder ring at level of last pectoral-fin

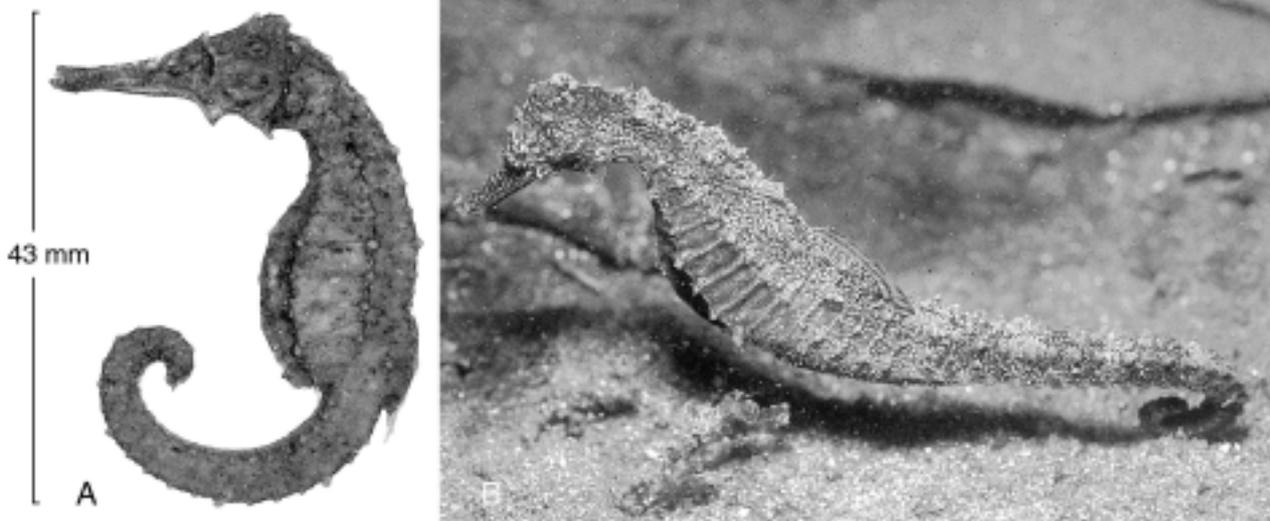


Figure 10. *Hippocampus kampylotrachelos*. A, ♀, NTM S12060-001, Ashmore Reef, Timor Sea. B, ♂, Bali, Indonesia, photo by Akira Ogawa.

ray; lower shoulder-ring spine of moderate size and recurved; lateral head spine recurved; body tubercles of small to moderate size along dorsal and lateral ridges, but enlarged and pointed at regular intervals, especially at dorsal-fin base and along superior tail ridges, gradually becoming smaller on tail. *Lateral line*: not detected. *Coronet*: low, directed backwards, with 5 blunt diverging spines in a star at apex. *Colour in life*: dusky brownish grey to almost black, covered with fine white and black spots and scribbles, especially on head where these form a pattern radiating from eyes, and lines along lower part of operculum; dorsal fin with two longitudinal lines, one marginally and one centrally. *Colour in alcohol*: nearly black with traces of spots and lines on head in the pattern described for living specimens.

Measurements. Specimen illustrated in Fig. 10 from Bali was estimated at 22 cm in height. The NTM S12060-001 specimen from Ashmore reef is about 96 mm in height but is missing the end of the tail. Snout is about equal to half length of head.

Distribution. Found in Sumatra (type locality), Bali and Timor Sea. It occurs on muddy substrates and either in very sheltered estuaries, or in deep coastal waters.

Remarks. *Hippocampus kampylotrachelos* is known from only a few specimens, but is a distinctive species that is unlikely to be confused with other congeners. The head has an elongate look and is less angled to body compared with most other seahorses. A specimen was found on land amongst nesting birds at Ashmore Reef, Western Australia, fits Bleeker's description of *H. kampylotrachelos* perfectly, and is the only record for Australia. It may have been a casualty of trawling and was either picked-up by birds or washed ashore. Counts and measurements include the Ashmore Reef specimen, underwater photographs, and Bleeker, 1983, pl. 449, fig. 2.

Material examined. NTM S12060-001, ♀, height c. 96 mm, Ashmore Reef, WA.

Hippocampus dahli

Low-crown Seahorse

Fig. 11

Hippocampus lenis de Vis, 1908. Nomen nudum.
Hippocampus dahli Ogilby, 1908. Noosa, Queensland.
Hippocampus planifrons (non Peters) Whitley, 1952.
Hippocampus planifrons (non Peters) Paxton *et al.*, 1989.
Hippocampus planifrons (non Peters) Johnson, 1999.
Hippocampus trimaculatus (non Leach) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 21–22 (usually 21); pectoral-fin rays 17–18 (usually 17); tail rings 37–40 (usually 39); nose without spine, profile straight, raised from snout at 55–60° angle; coronet very low, front and lateral edges rugose, posterior edge with 3 short backward directed spines; single, recurved lower shoulder-ring spine; lateral line distinct to 19th–23rd tail ring. *Fin rays*: dorsal 21–22 (usually 21); pectoral 17–18 (usually 17); anal 4. *Rings*: subdorsal 2–3 + 1–2, (usually a total of 4); trunk 11; tail 37–40 (usually 39). *Spines or tubercles*: subdorsal 3/0,1,1 or 4/0,0,1,1; small recurving spine above eye; nape spine small, directed upwards; shoulder-ring spines small, uppermost low and directed upwards next to gill-opening, central spine tubercular at level of last pectoral-fin ray, lowermost as recurved spine; lateral head spine as low a tubercle; body tubercles of small to moderate size along dorsal and lateral ridges, few slightly enlarged, especially along dorsal-fin base. *Lateral line*: a small pore just above lateral ridge on trunk at each ring, continuing to about 19th–23rd tail ring, intermittent over last few rings. *Coronet*: very low, front and lateral edges rugose, posteriorly with 3 short backward directed spines. *Colour in life*: females mostly pale brown to almost black, usually with small black scribble marks that sometimes form lined, zebra-like patterns. Males usually dark brown nearly to black with black scribbles. *Colour in alcohol*: similar to life colours, with pale colours more brown and dark colours almost black.

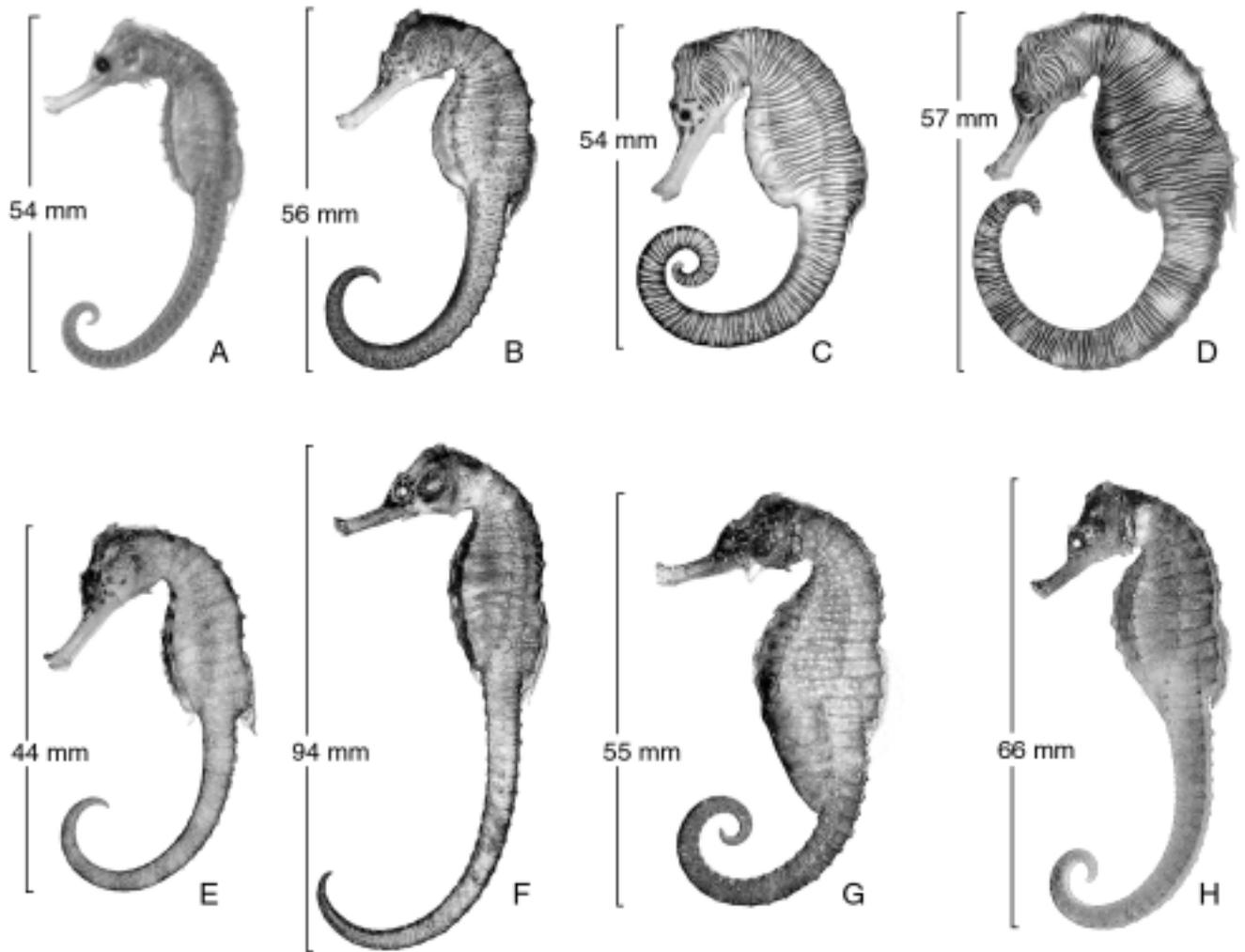


Figure 11. *Hippocampus dahli*. A, holotype, ♀, QM I788, Noosa, Qld. B, ♀, QM I14027, off Shorncliffe, Moreton Bay, Qld. C, ♀, QM I14068, off Shorncliffe, Moreton Bay, Qld. D, ♀, AMS I19655-001, Gulf of Carpentaria, NT. E, ♀, NTM S10106-001, Darwin, NT. F, ♀, NMV A21620, Townsville, Qld. G, ♂, NTM S13790-001, Beagle Gulf, NT. H, ♂, QM I31366, Fraser I., Qld.

Measurements. Largest specimen examined with a height of 116 mm. Length of tail about 60% of height; trunk about 38% of height; head 78% of trunk. Trunk depth highly variable, about 50–80% of head, depending on size and sex. Juveniles and non-gravid females more slender than males and gravid females. Length of snout is about half length of head.

Distribution (Fig. 12). Occurs in coastal waters of northeastern Australia from Moreton Bay to Darwin. Most specimens in collections were trawled in shallow waters on rubble substrates, with 21 m the greatest depth recorded.

Remarks. Ogilby described *Hippocampus dahli* on the basis of a specimen from the Queensland Museum collection that was labelled as *H. lenis* de Vis. However, no description of *H. lenis* was ever published and the name is regarded as merely a museum name. Since Whitley (1952) synonymised the names *H. dahli* and Western Australian *H. planifrons*, specimens with a low coronet were regarded as a single species that was broadly distributed in tropical Australian waters. This study has revealed that *H. dahli* is a valid species restricted to northeastern Australia between about Moreton Bay and Darwin. Most specimens in collections

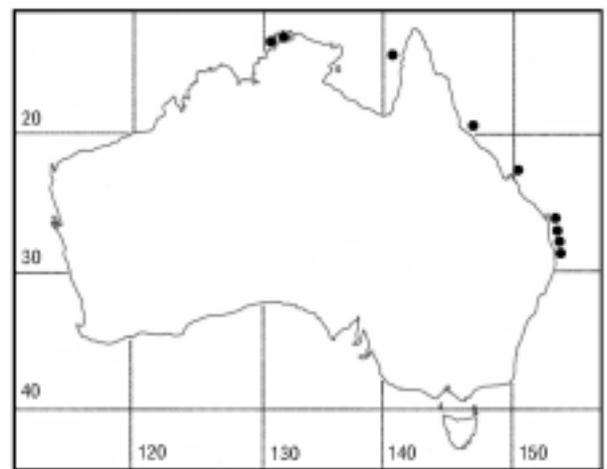


Figure 12. *Hippocampus dahli*. Collection sites of specimens examined.

were trawled in shallow coastal waters on rubble substrates. In Moreton Bay, where this species was common, populations appear to have declined significantly since the 1960s (Johnson, 1999, as *H. planifrons*). Specimens from

northern waters compared to those from southern Queensland have fewer tail rings (usually 37–38 versus 39–40) and a slightly different colouration. Northern males are very dark with series of small white spots instead of dark brown with black scribbles. These differences appear minor and are regarded as clinal variations.

Material examined. QM I1788, HOLOTYPE, ♀, height 80 mm, beach, Noosa, Qld, Mrs Birkbeck, 1912. QM I14027, ♀, height 86 mm, Shorncliffe, Qld, trawled in 5 fm, W Croft, Apr 1977. QM I14067, ♂, height 100 mm, Shorncliffe, Moreton Bay, Qld, trawled, W. Croft, May 1977. QM I14068, ♀, height 93 mm, Shorncliffe, Moreton Bay, Qld, trawled, W. Croft, May 1977. QM I26679, ♀, height 116 mm, central Moreton Bay, Qld, trawled, H. Weng, 8 Aug 1974. QM I31366, ♂, height 86 mm, Eurong beach, Fraser I., Qld, beach washed, R. Hobson, 2 Feb 1999. NTM S10106-001, ♀, height 70.5 mm, Van Diemen Gulf, NT, NT Fisheries, 17 Jan 1978. NTM S10284-003, ♀, height 82.5 mm, off Mickett Ck, Shoal Bay, NT, 12°18'S 130°58'E, depth 3 m, NT Fisheries, 20 Oct 1977. NTM S11664-001, ♂, height 55.6 mm, Kahlin Beach, Darwin Harbour, NT, 12°27.1'S 130°49.1'E, depth 3–10 m, R. Williams, 2 May 1985. NTM S13717-002, ♀, height 81.5 mm, Haycock Reach, Darwin Harbour, NT, 12°36.8'S 130°56.4'E, depth 4 m, R. Williams, 14 Jul 1993. NTM S13790-001, ♂, height 82 mm, Bynoe Harbour, Beagle Gulf, NT, 12°41'S 130°33'E, depth 9 m, R. Williams, 7 Oct 1993. AMS I15557-076, ♀, height 100 mm, Gulf of Carpentaria, Qld, 17°24'S 140°09'E, CSIRO prawn trawl, 27 Nov 1963. AMS I15864-001, ♀, height 115 mm, SE North Keppel I., Qld, 21 m, 23°05'S 154°45'E, W. Ponder, 25 Jul 1969. AMS I19655-001, ♀, height 95 mm, Gulf of Carpentaria, Qld, 15°29'S 141°29'E, CSIRO, 8 Dec 1976. AMS I23676-002, juvenile, height 60 mm, and AMS I23677-001, juvenile, height 70 mm, both with data: power station screens, Gladstone, Qld, 23°52'S 151°16'E, P. Saenger, 2 Jan 1979. NMV A21620, ♀, height 125 mm, off Townsville, Qld, M.L. Horne, Feb 1999.

Hippocampus planifrons

Flat-face Seahorse

Fig. 13

Hippocampus planifrons Peters, 1877. Shark Bay, Western Australia.
Hippocampus trimaculatus (non Leach) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 23–24 (usually 23); pectoral-fin rays 18–19; tail rings 37; subdorsal spines 4/0,0,1,1 or 5/0,0,0,1,1; single lower shoulder-ring spine, directed

outward; snout short, about equal to postorbital length with dark lateral spots. *Fin rays:* dorsal 23–24 (usually 23); pectoral 18–19; anal 4. *Rings:* subdorsal 3–4 + 1, dorsal origin variable in position, from in front of, on, or behind 8th trunk ring; trunk 11; tail 37–38. *Spines or tubercles:* subdorsal 4/0,0,1,1 or 5/0,0,0,1,1; small outwards curving spine above eye; nape spine small, pointing up and forward; shoulder ring spines small, uppermost spine low and directed outward next to gill-opening, central spine at level just below level of centre of pectoral-base, lowermost spine directed outward; small lateral head spine; small spine behind eye; body spines of small to moderate size along dorsal and lateral ridges, few enlarged, most prominently along dorsal-fin base. *Lateral line:* pores small but distinct, situated just above lateral ridge on trunk at each ring, reaching about 18th tail ring. *Coronet:* slightly raised, 2 small front spines, posteriorly 3 spines of moderate size and middle spine enlarged and recurved. *Colour in life:* females greenish brown with dark blotching over dorsal region of trunk and tail. Snout with dark lateral spots. *Colour in alcohol:* mainly brown with dark spots on snout.

Measurements. Largest specimen examined with height of 70.2 mm. Length of trunk about 36% of height; length



Figure 14. *Hippocampus planifrons*. Collection sites of specimens examined.

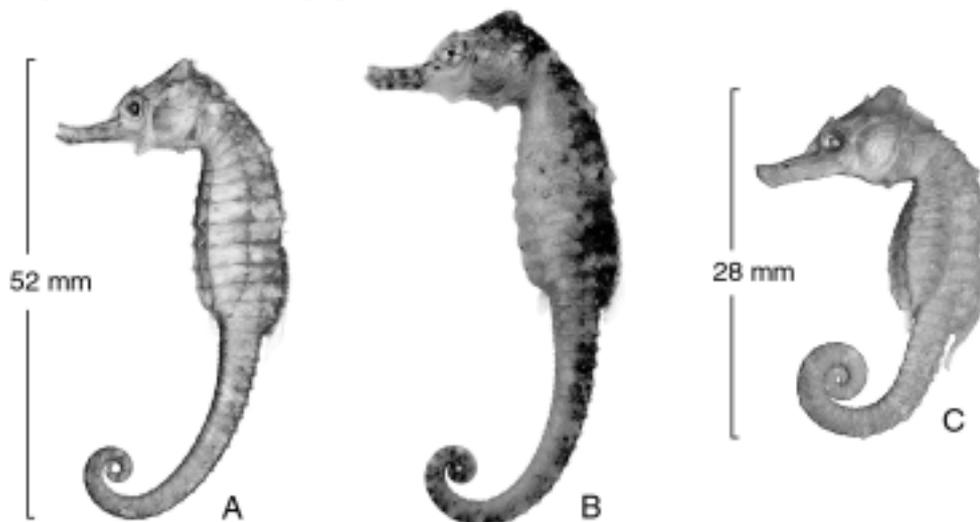


Figure 13. *Hippocampus planifrons*. A & B, ♀, WAM P26674-006 (A, preserved; B, fresh), Shark Bay, WA. C, juvenile, AMS IA4276, Broome, WA.

of head 68% of trunk. Trunk depth 60% of head length. Length of snout about equal to postorbital length.

Distribution (Fig. 14). Only known from Shark Bay and Broome. Records from the Northern Territory and Queensland are misidentified *Hippocampus dahli*.

Remarks. A photograph of the holotype of *Hippocampus planifrons*, provided by Sara Lourie, shows a specimen virtually identical to Fig. 13A. The holotype is slightly smaller (head length 16 mm, versus 17 mm), and the original description indicates that it has of 23 dorsal-fin rays and 19 pectoral-fin rays, which conforms with the specimens in Australian museums. This species is similar to *H. dahli*, but the coronet is not as low; the spines on the trunk and tail ridges are more developed; its nape spine is directed well forward and away from the coronet, rather than upwards; and the coloration is distinctly different, especially the presence of spots laterally on the snout, that are absent in *H. dahli*.

Material examined. ZMB 9387, HOLOTYPE, photograph, Naturalists Channel, NW Australia, 10 fm, Apr 1876. WAM P26674-006, ♀, height 70.2 mm, Dirk Hartog I., WA, 26°08'S 113°10'E, rockpool, 0.5 m, J.B. Hutchins, 18 Apr 1979. WAM P9403, ♀, height 54 mm, Shark Bay, WA, N.E. Milward, no date. AMS IA4276, juvenile, height 40 mm, Broome, WA, 18°01'S 122°12'E, A.A. Livingstone, 3 Sep 1929.

Hippocampus biocellatus n.sp.

False-eyed Seahorse

Fig. 15

Hippocampus sp. 5 Kuiter, 2000, p. 50.

Type material. HOLOTYPE: WAM P9398, height 94.8 mm, ♂, Kok Island to Quobba Point, Shark Bay, Western Australia, W. & W. Poole Bros, *Bluefin*, 23–30 Aug 1958. PARATYPES: WAM P28611-005, height 98 mm, Shark Bay, WA, 25°25'S 113°30'E, RV *Peron*, Mar 1966. WAM P30081-002, height c. 60 mm, Shark Bay, WA, 26°09'S 113°13'E, box trawl, 1.0–1.5 m, J.B. Hutchins *et al.*, 29 Mar 1990. WAM P14584, height 108 mm, Shark Bay, R.J. McKay, 3 Apr 1962. WAM P9402, height 68 mm, Shark

Bay, R.J. McKay, 1962. WAM P30998-001, height c. 95 mm, Dorre I., off Quoin Bluff, Shark Bay, dredge, 12 m, L. Marsh, 13 May 1995.

Diagnosis. Dorsal-fin rays 22–23; pectoral-fin rays 16–18; anal-fin rays 4–5, the rays divided at base; tail rings 36–38; subdorsal spines 4/0,0,1,1 or 5/0,0,1,1,1; nose ridge slightly raised, without a spine; spine above eyes moderately large, angled back and laterally outward; lateral head spine moderately large and recurved; spines behind and below eye small; coronet slightly raised, apex with 5 blunt diverging spines; upper shoulder-ring spine of small to moderate size, situated beside gill opening; central shoulder-ring spine small and tubercle-like, lower shoulder-ring spine of moderate size and directed laterally outward; superior trunk and tail ridges with broad thorn-like blunt spines, enlarged on some rings at regular intervals; superior tail ridge with tubercle-like spines of moderate size, angled backward; trunk ridges followed by connecting tail ridges with spines and tubercles becoming gradually smaller posteriorly; lateral line with distinct pores, on trunk rings just above lateral ridge, continuing onto tail to 18th–23rd tail ring, each pore between raised papillae.

Description. Head moderately long, 70% of trunk length; snout moderately long, 40% of head length; dorsal fin with 22 rays (23 rays in three of five paratypes), base long, reaching well over 3 trunk rings and 1 tail ring (2 tail rings in three of five paratypes); pectoral-fin rays 16 (17 in four paratypes and 18 in one paratype); anal fin of moderate size, with 4 rays divided at basal joints (5 rays divided at basal joints in one of five paratypes); trunk rings 11; tail rings 36 (36–38); small spine above eyes, its length less than diameter of eye pupil, directed backward and laterally outward; a moderately large lateral head spine, curving backwards; a small upward directed nape spine; small spine behind eye; small spine below eye; upper shoulder-ring spine small, situated at gill opening directed laterally outward, central spine developed as a tubercle at level of 7th–9th last pectoral-fin ray, and lower spine moderately large and directed laterally outward; coronet slightly raised, apex star-like with 5 blunt diverging spines; neck-ridge centrally raised with small thorn-like spine and a small

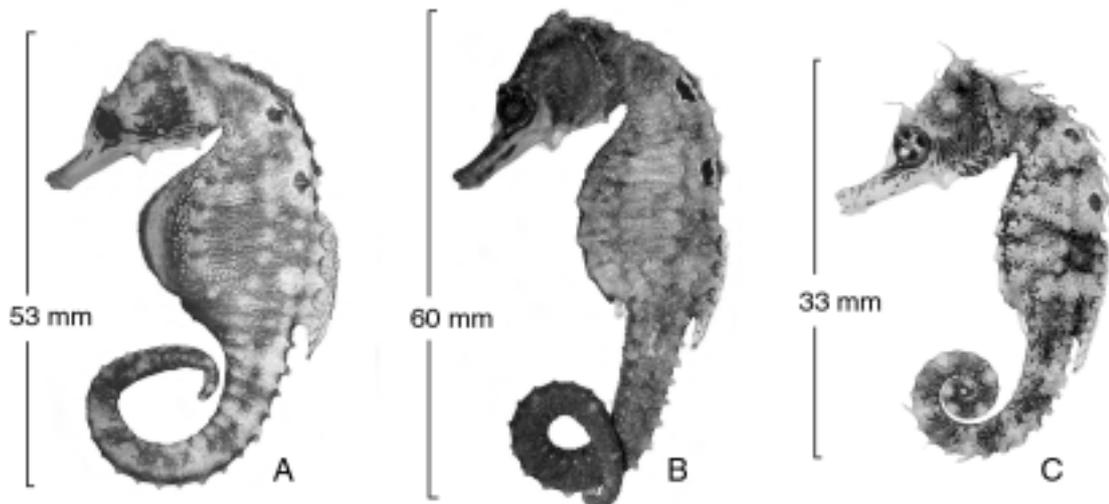


Figure 15. *Hippocampus biocellatus*. A, holotype, ♂, WAM P9398, Shark Bay, WA. B, paratype, ♀, WAM P28611-005, Shark Bay, WA. C, paratype, ♀, WAM P30081-002, Shark Bay, WA.



Figure 16. *Hippocampus biocellatus*. Collection sites of specimens examined.

slender spine at posterior end; superior trunk ridge with angular tubercles of moderate size, enlarged on 1st, 4th, and 7th to 11th rings; lateral trunk ridge with similar tubercles beginning on 2nd ring, increasing in size of subsequent rings, slanting downwards on last few rings; ventral trunk ridge with thick membranous keel of skin along edge; subdorsal spines 4/0,0,1,1 (5/0,0,1,1,1 in one of five paratypes); superior tail ridge spines well developed anteriorly, becoming smaller posteriorly, reaching to 14th ring, with slightly enlarged spines on 5th and 8th rings; inferior tail ridge a continuation of inferior trunk ridge, becoming less prominent over first 9 tail rings, subsequent rings with smooth edge; lateral line pores usually obvious with dark papillae raised on sides to 21st tail ring (to 23 in one of five paratypes). Largest specimen 108 mm in height. *Colour in life*: blotched patterns of pale cream-grey to pale brown with blackish scribbles and fine yellowish cream spots mixed in. Head often with thin black lines around eye and over operculum. Two distinctive black ocelli surrounded with yellow laterally on upper sides of the trunk, situated on enlarged superior ridge spines of 4th and 7th rings. Two thin longitudinal dark lines along dorsal fin, one marginally and one centrally. *Colour in alcohol*: similar to fresh material, with dark colours reddish brown and black spots on back remaining distinct.

Distribution (Fig. 16). Appears to be restricted to the Shark Bay region of Western Australia, where it occurs in shallow algae or weedy reef habitats from the intertidal zone to a depth of about 20 m.

Remarks. This species is named *biocellatus*, from the Latin *bi* (two) and *ocellus* (eye) in reference to the double eye-like spots on back, which may serve to distract predators. Seahorses usually lean forwards and often tuck their head below their trunk when threatened. In this position the eye-like spots would be positioned horizontally on top. Amongst weed this might look more like a crab or a fish that would be more of a threat to “seahorse predator” than a potential meal. Males of this species have a deep keel-like skin membrane on the ventral trunk ridge that maybe used during courtship display. This species is very similar to *H. planifrons* which, in addition to colour, differs from it in having a longer and more slender trunk, the trunk length

length more than twice the depth, rather than less than twice the depth. *Hippocampus planifrons* also has generally smaller spines compared to those of *H. biocellatus*, especially subdorsally.

Hippocampus breviceps

Short-head Seahorse

Fig. 17

Hippocampus breviceps Peters, 1869. Adelaide, South Australia.

Diagnosis. Dorsal-fin rays 21–22 (usually 22); pectoral-fin rays 13–14; head and body rather fleshy without obvious spines, but often with long filaments above eyes, on nape, coronet and superior trunk ridges anterior to dorsal fin; coronet distinctly raised with fleshy covering and apex rounded with up to 5 fleshy filaments. *Fin rays*: dorsal 21–22 (usually 22); pectoral 13–14; anal 4. *Rings*: subdorsal 3 + 1; trunk 11; tail 38–42. *Spines or tubercles*: subdorsal 3–4/0,0,1,1 or 3–4/0,0,1,0; no spines evident on head, covered by thick fleshy skin and usually with small to long dermal appendages above eyes, at nape and on superior trunk ridges; low rounded tubercles intermittently on lateral and inferior trunk ridges, and on superior tail ridge, the most prominent beside dorsal-fin base. *Lateral line*: distinct with large pores on rings just above lateral ridge on trunk, continuing onto tail to about 20th tail ring; each pore usually with several papillae. *Coronet*: distinctly raised with fleshy covering; apex rounded with up to 5 fleshy filaments, one usually at centre. *Colour in life*: drab grey to bright yellow-orange with mix of numerous small black spots and black-ringed white ocelli over much of trunk and anterior part of tail. *Colour in alcohol*: mainly cream to pale brown with dark spots on head and ocelli in the form of tiny dark circles mixed with dark spots on head and trunk.

Measurements. Largest specimen examined with a height of 62 mm, but much larger individuals known, estimated to 10 cm in height. Length of trunk is 32–35% of height; head large, about 78–85% of trunk length; snout short in adults, about 33% of head, but proportionally longer in juveniles, up to 50% of head when small.

Distribution (Fig. 18). South Australian gulfs to the Bass Strait region of Victoria and Tasmania, but apparently absent from eastern Victorian waters. Occurs in protected bays or estuaries. Associates with brown algae *Sargassum* spp. on low, shallow reefs.

Remarks. The holotype of *Hippocampus breviceps* ZMB 7082 is missing. However, its description and locality can only apply to this taxon, as there are no other similar species in the type locality. Adults of this small temperate species are normally covered with thick fleshy skin and have appendages on the head and over the back that are usually long in males (Fig. 17A). The species lacks spines, and tubercles are few or reduced, usually being best developed along the dorsal-fin base and over the superior ridge of the tail, although they are often mostly fleshy.

Material examined. NMVA17236, ♂, height 62 mm, Port Phillip Bay, Vic., 37°59.8'S 145°02.1'E, depth, 3 m. R. Ickeringill & M. Lockett, 9 Dec 1995. NMVA13008, ♀, height 55 mm,

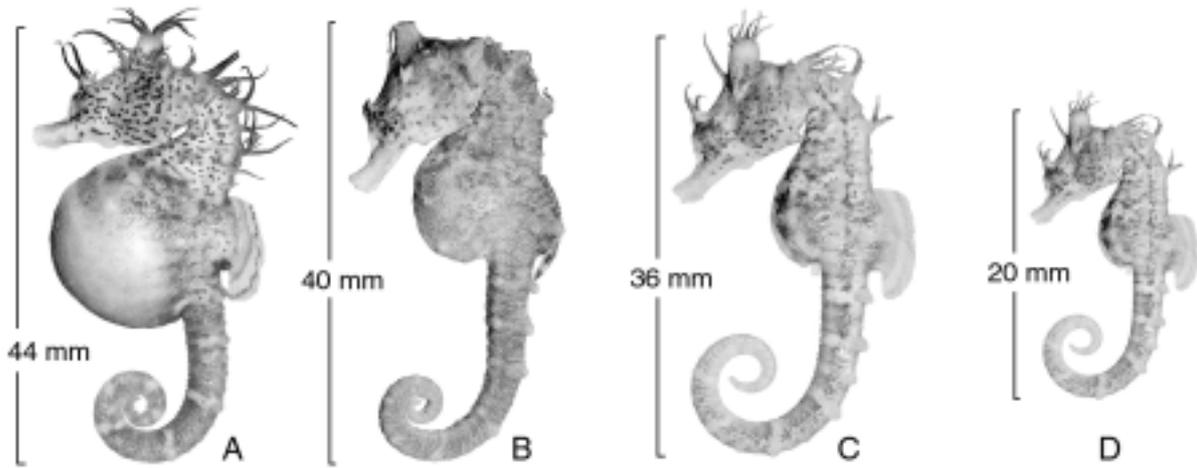


Figure 17. *Hippocampus breviceps*. A, ♂, NMV A17236. B, ♀ NMV A13008, Port Phillip Bay, Vic. C, ♀ NMV A19732, Port Phillip Bay, Vic. D, juvenile, NMV A17232, Port Phillip Bay, Vic.

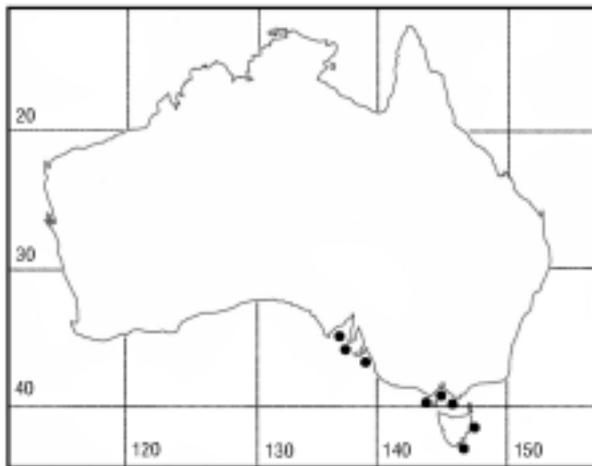


Figure 18. *Hippocampus breviceps*. Collection sites of specimens examined and localities of specimens photographed underwater.

Williamstown, Port Phillip Bay, Vic., 37°52'S 144°53'E, R.J. King, 28 Aug 1969. NMV A19732, ♀, height 52 mm, Port Arlington, Port Phillip Bay, Vic., depth 3 m, M. Lockett & T. Bardsley, 9 Apr 1997. NMV A17232, juveniles (3), heights 28–38 mm, Corio Bay, Port Phillip Bay, Vic., 38°06.1'S 144°22.6'E, depth 2 m, T. Bardsley & R. Ickeringill, 2 Dec 1995.

Hippocampus tuberculatus

Knobby Seahorse

Fig. 19

Hippocampus tuberculatus Castelnau, 1875. Swan River, Western, Australia.

Hippocampus breviceps (non Castelnau) Paxton *et al.*, 1989: in part. *Hippocampus breviceps* (non Castelnau) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 20–21; pectoral-fin rays 14–15; coronet tall and angled back, square to rounded in cross section, without spines on corners, but with small spine

centrally on apex; adults with large tubercles on back and tail. *Fin rays:* dorsal 20–21; pectoral 14–15; anal 4. *Rings:* subdorsal 3 + 1; trunk 11; tail 36–37. *Spines or tubercles:* subdorsal spines 4/0,0,1,0; moderately long spine above eyes, with secondary smaller spine anteriorly at base, similar in shape to nose ridge; small spine behind eye; large lateral head spine; nape spine of moderate size, directed upward; 2 separate low angular spines below eye; 3 moderate to long spines on shoulder ring, uppermost at gill-opening, central spine at level of last pectoral-fin ray, and lowermost largest and recurving; neck ridge with 2 small spines; superior trunk ridge with blunt rounded spines of moderate size, enlarged on rings 1, 3, 5, and subdorsally; lateral trunk ridge with enlarged spines on rings 3, 5, and 7; inferior trunk ridge with last 3 spines enlarged; ventral trunk with low downward directed spines; superior tail ridge with enlarged spines up to about eye-size on every 2nd or 3rd ring, becoming gradually smaller posteriorly; inferior tail ridge a continuation of trunk ridge, with spines gradually reducing in size. *Lateral line:* well developed with pores on low-tubes, visible to about 28th tail ring. *Coronet:* coronet tall and angled back, square to rounded in cross section, without spines on corners, but with small spine centrally on apex, angled upward when young, becoming smooth and rounded in mature adults. *Colour in life:* specimens from floating *Sargassum* dark brown to almost black with a well defined white area over interorbital extending to base of coronet and to tip of snout. Adults on reefs mainly yellow to brown, with white area over front of head, some black spotting over operculum, and often tubercles over back bright red. *Colour in alcohol:* mainly brown; some with fine black spots on operculum or below dorsal-fin base.

Measurements. Largest specimen examined 74 mm in height. Trunk short, 26–32% of height; head moderately large, 75–80% of trunk length; snout short, about 35–50% of head length (proportionally longest in young and sub-adults).

Distribution (Fig. 20). Restricted to Western Australia between Perth and Onslow. *Hippocampus tuberculatus* is often found offshore in floating *Sargassum* during juvenile and sub-adult stages, some males have fully

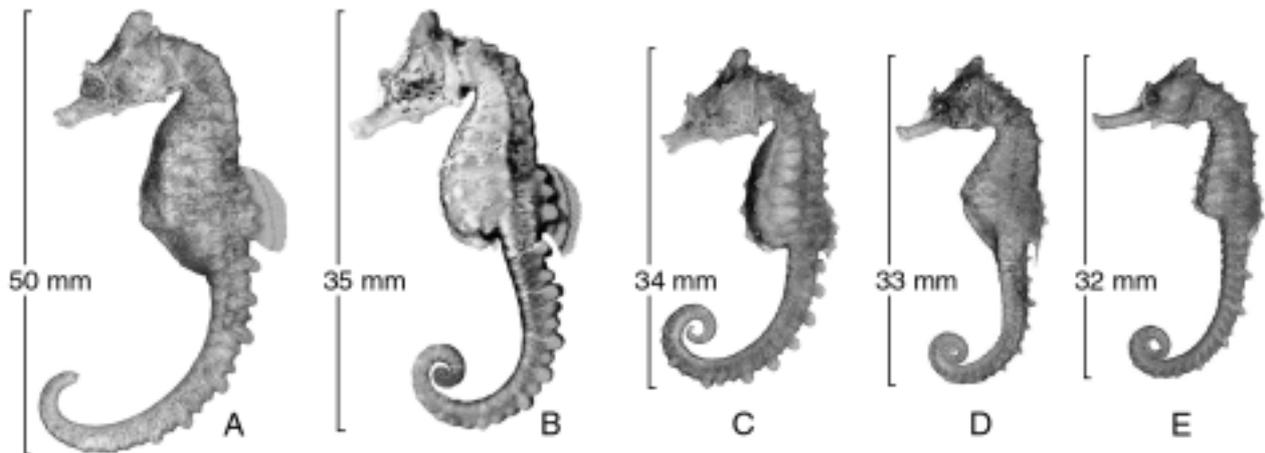


Figure 19. *Hippocampus tuberculatus*. A, ♂, WAM P28259-001, Swan River, Perth, WA. B, ♀, WAM P25808-001, off Perth, WA. C, ♀, WAM P29245-002, Rockingham, WA. D ♂, E ♀, WAM P24564.001, off Onslow, WA.



Figure 20. *Hippocampus tuberculatus*. Collection sites of specimens examined.

developed pouches. Adults settle on sponge reefs in depths of about 20 m.

Remarks. The name *tuberculatus* is very appropriate for this species, with its large tubercles on the back and tail of adults. The holotype MNHN A4539 was examined by Sara Lourie, but she placed *Hippocampus tuberculatus* in synonymy with *H. breviceps*, and illustrating latter with a specimen of *H. tuberculatus* (Lourie *et al.*, 1999, p. 141). This species has an angular nose ridge and double spines above each eye and is generally spinnier than the closely related *H. breviceps*, from temperate latitudes of southeastern Australia. The two species treated as synonyms until now.

Material examined. WAM P28259-001, ♂, height 74 mm, Fremantle, WA, 32°03'S 115°44'E, P. Crystal, 25 Jun 1980. WAM P25808-001, ♀, height 54 mm, E 5 Fathom Bank, WA, 32°16'S 115°39'E, Flinders, 20 m, 29 Nov 1977. WAM P29245-002, ♀, height 50 mm, Rockingham, WA, 32°17'S 115°42'E, J.B. Hutchins, Feb 1976. WAM P24564-001 (9), heights 44–51 mm, Onslow area, WA, 21°38'S 115°07'E, G. Lang, Nov 1973.

Hippocampus taeniopterus

Common Seahorse

Fig. 21

Hippocampus taeniopterus Bleeker, 1852b. Ambon, Indonesia.
Hippocampus melanospilos Bleeker, 1854a. Ambon, Indonesia.
Hippocampus kuda (non Bleeker) Paxton *et al.*, 1989.
Hippocampus kuda (non Bleeker) Randall *et al.*, 1990.
Hippocampus kuda (non Bleeker) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 17–18; pectoral-fin rays 16; subdorsal rings 2 + 1–2; tail rings 34–35; spines low and blunt in juveniles, reducing or becoming rounded and knob-like in adults; small nose-spine present; shoulder-ring spines small, upper at gill-opening, centre at level of last pectoral-fin ray, lower single and not enlarged; large specimens often with many papillae on nape and interorbital and body. *Fin rays:* dorsal 17–18; pectoral 16 (one specimen with 18 on one side); anal 4. *Rings:* subdorsal 2 + 1–2; trunk 11; tail 34–35. *Spines or tubercles:* subdorsal 3–4/0,1,1–0,1,1,1. Spines low and blunt when juvenile, reduced or rounded and knob-like in adults. Small spine above eye; nose spine small; nape spine small; small spine behind eye; double low spines below eye; shoulder-ring spines small, uppermost at gill-opening, central spine at level of last pectoral-fin ray, lowermost single and not enlarged; trunk ridges with enlarged spines or tubercles on rings 1, 4, 7 or 8 and 11, and on tail on about 5th, 9th, 12th, and 15th ring, though varying in position by up to one ring, largest near pouch area of male, becoming gradually smaller posteriorly on tail. *Lateral line:* pores small, more or less distinct, becoming intermittent on tail, ranging to 20th ring. Pores often positioned between 2 large papillae, although large specimens usually have many additional papillae, on nape and interorbital, as well as body. *Coronet:* small but well developed with 5 diverging sharp spines on apex in young, becoming proportionally smaller with large adults, having smooth apex and 3 rounded points angled backwards. *Colour in life:* (based on underwater photographs taken in Milne Bay, PNG) grey to brown, often with fine dark spots and pale scribbles and striations; females sometimes yellow with pupil-sized black spots that may elongate on trunk over rings. *Colour in alcohol:* pale to dark brown, usually covered with small dark spots.

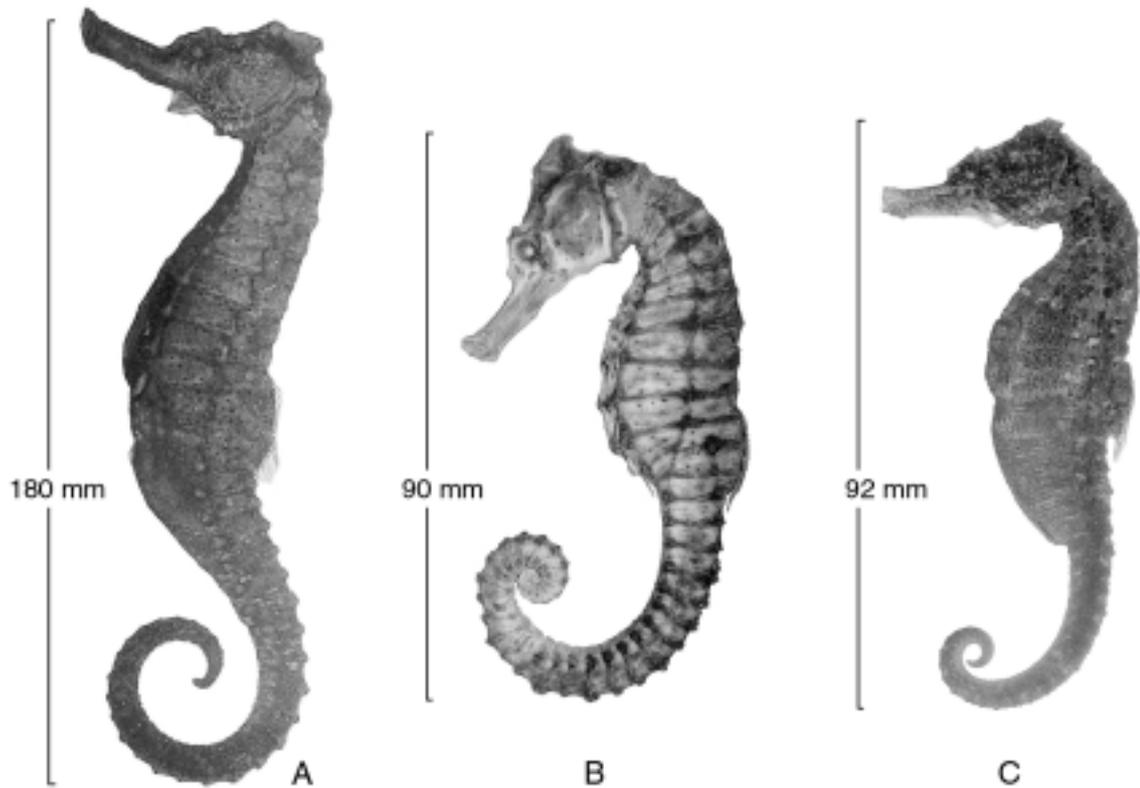


Figure 21. *Hippocampus taeniopterus*. A, ♂, AMS I9309, Darwin Harbour, NT. B, ♀, AMS I9203, SE coast, New Guinea. C, ♂, QM I20093, Russell River, Qld.

Measurements. Largest specimen examined 20 cm in height. Snout thick in adults, its length about equal to distance between eye and gill-opening.

Distribution (Fig. 22). Occurring in the Moluccan seas and ranging south to Papua New Guinea and tropical eastern Australia. A shallow water species, found mainly in coastal areas along edges of seagrass beds or in mangroves to about 15 m depth. Juveniles as well as adults sometimes found in floating weeds well offshore, especially during the wet season.

Remarks. No types are known and *Hippocampus taeniopterus* has been treated by recent authors as a

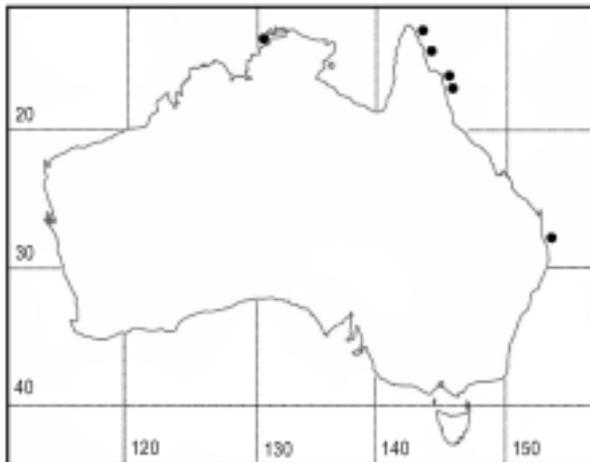


Figure 22. *Hippocampus taeniopterus*. Collection sites of specimens examined.

synonym of *H. kuda* Bleeker, 1852a. I follow Bleeker in recognising it as a valid species. *Hippocampus taeniopterus* is common in most parts of its range, but it appears to be less so in Australian waters. Australian specimens are rare in collections, but this may be due to a shortage of collecting in the remote northern region and inshore habitats along the Queensland coast. As adults regularly occur in floating weeds they may travel a long way south from areas like southeastern Papua New Guinea where the species is known to be abundant. Some Australian specimens like a Moreton Bay specimen (AMS I12555), may represent expatriates.

In addition to slight meristic and morphological differences, *H. kuda* is distinguishable from *H. taeniopterus* in usually having dermal appendages on the head spines, coronet, and on the enlarged spines or tubercles of superior ridges. Bleeker described *H. kuda* from a specimen from Singapore and in his remarks following his descriptions of *H. moluccensis* (1852b) suggested that the dermal appendages are diagnostic. This is consistent with specimens from Sri Lanka observed in a Melbourne aquarium, which have filaments below the snout and to various degrees on nape and coronet. Juveniles are somewhat spiny over superior ridges and have spiny coronets. Some have distinctive double white spots on trunk, especially subdorsally. An illustration in Bleeker (1883, fig. 5, pl. 449), captioned “*Hippocampus guttulatus* Cuv. = *kuda* Blkr.” matches the description of *kuda*, Bleeker’s further remarks in 1852b, and additional specimens from Singapore (pers. obs.). The use in the Atlas of the name *H. guttulatus*, a European species which often has long appendages similar to *H. kuda* seems incorrect. *Hippocampus guttulatus* is readily distinguished from *H. kuda* by a much taller dorsal

fin and colour patterns. Some synonyms may have been created by ichthyologists who continued Bleeker's work after his death, possibly causing errors. Photographs of *H. kuda* in the literature were taken in the Ryukyu Is, southern Japan (Kawanabe & Mizuno, 1989), Cebu, Philippines (Allen & Steene, 1987); the latter photograph was used in Randall *et al.*, 1990, but replaced by a photograph of *H. taeniopterus* from Papua New Guinea in the 2nd edition 1997 (Steene, pers. com.). On the basis of published photographs and my own observations *H. kuda* ranges from Andaman Sea to southern Japan, but there are no records east of Wallace's Line; *H. taeniopterus* is its replacement there.

Material examined. QM I20093, ♂, height 115 mm, Russell River, near mouth among mangrove roots, NE Qld, J. Johnson, Nov 1982. NMV A8952, ♂, height 95 mm, Cooktown, Qld, 15°28'S 145°15'E, 1943. AMS I9309, ♂, height 20 cm, Port Darwin, NT, 12°27'S 130°48'E, S.W. Cristie, 1908. AMS I9203, ♀, height 135 mm, SE coast New Guinea, Macleay, 1907. AMS I12555, ♀, height 115 mm, Moreton Bay, Qld, 27°S 153°E, Amateur Fishermans Association of Qld, 1912. AMS I38392-001, juvenile, height 21 mm, Lizard I., Qld, 14°40'S 145°28'E, surface capture over 30 m depth, M. Emslie, 31 Jan 1995.

Hippocampus tristis

Sad Seahorse

Fig. 23

Hippocampus tristis Castelnau, 1872. Melbourne fish market.
Hippocampus punctulatus (non Kaup) Ogilby, 1889: 732.
Hippocampus sp. A, Allen *et al.*, 1976. Lord Howe I.
Hippocampus whitei (non Bleeker) Paxton *et al.*, 1989: in part.
Hippocampus kuda (non Bleeker) Lourie *et al.*, 1999: in part.
Hippocampus kelloggi (non Jordan & Snyder) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 18–19; pectoral-fin rays 18–19; subdorsal rings 2 + 1–2; tail rings 35–37; nose profile straight, small spine present; head and body spines small and blunt, proportionally smallest in largest specimens, most trunk ridges with low tubercles; upper shoulder-ring spine

small, situated just below gill opening, and lower shoulder-ring spine thick, knob-like, single or double with less developed secondary spine anteriorly; neck ridge short and distinctly raised above gill opening. *Fin rays:* dorsal 18–19; pectoral 18–19; anal 4. *Rings:* subdorsal 2 + 1–2; trunk 11; tail 35–37. *Spines or tubercles:* subdorsal 3/0,1,0. Head and body spines small and blunt, becoming relatively smaller with age, most trunk ridges with low tubercles; tubercles on males mainly on inferior trunk ridges and on tail along pouch region; nose spine small and greatly reduced in large individuals; spine above eye small, directed upward, lateral head spine moderately long; shoulder-ring spines variable from poorly to moderately developed, uppermost small just below gill-opening, central spine at level of last pectoral-fin ray, and lowermost thick, knob-like, single or double with less developed secondary spine anteriorly; neck ridge short and distinctly raised above gill opening. *Lateral line:* pores small without papillae, more or less distinct, becoming intermittent on tail, ranging to 17th ring. *Coronet:* small but well developed with 5



Figure 24. *Hippocampus tristis*. Collection sites of specimens examined.

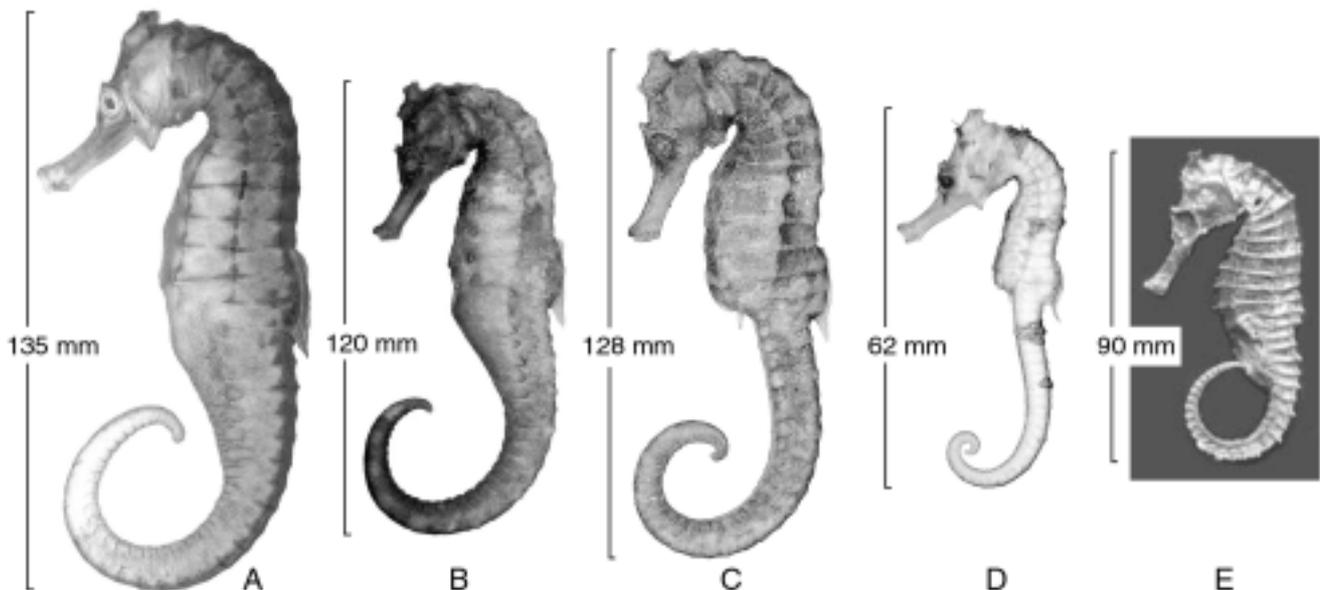


Figure 23. *Hippocampus tristis*. A, ♂, QM I1008, Lord Howe I., NSW. B, ♂, AMS I38517-001, Clarence River area, NSW. C & D, ♀ and juvenile, QM I30574, Stradbroke I., Qld. E, syntype, MNHN A4538, unknown locality, photo by Sara Lourie.

diverging short spines on apex in young, becoming less prominent with age, almost smooth in large adults. *Colour in life*: drab grey to pale brown with dusky head and trunk, sometimes with numerous tiny white spots in longitudinal lines. Juveniles occasionally pale yellow; large juveniles occasionally with prominent saddle-like blotches, contrasting with general colour, at 1st, 4th and 8th trunk rings, and along tail. *Colour in alcohol*: cream to pale brown, some dark spotting near eyes on recently collected material.

Measurements. Largest specimen examined 222 mm in height. Snout thick in adults, its length about equal to postorbital length.

Distribution (Fig. 24). The extent of the range of *Hippocampus tristis* is uncertain. It is known from off Brunswick in northern New South Wales, from Lord Howe I. and from southern Queensland. All specimens from Queensland except one lot from Stradbroke I. have as the locality "South Queensland coast". Most specimens came from trawls between 18–53 m depth and some specimens washed up on beaches (probably trawl-casualties).

Remarks. Type specimens of *Hippocampus tristis* (MNHN A4537 & A4538), both adult males, were probably taken as bycatch by commercial fishermen in northern New South Wales waters. Photographs of the specimens, provided by Sara Lourie, show specimens that are virtually identical to specimens examined of similar size, including in the shape of the head, the high neck-ridge and the proportional features of the head and trunk. This species has been misidentified as *H. whitei*, *H. kuda*, and *H. kelloggi*. Juveniles of *H. tristis* may resemble females of *H. whitei*, small adults could be mistaken for *H. taeniopterus*, and very large individuals for *H. kelloggi*. *Hippocampus tristis* is readily distinguished from *H. whitei* by the smaller coronet and position of the uppermost shoulder-ring spine, at gill opening in *H. tristis* and near pectoral fin base in *H. whitei*. Morphologically, *H. tristis* and *H. taeniopterus* are very similar and the two are best distinguished by the lowermost shoulder-ring spine that is single in *H. taeniopterus* and usually double (anterior one sometimes small or not obvious) in *H. tristis*. The fin-ray counts are modally higher in *H. tristis* than in *H. taeniopterus* (D 18–19, P 18–19 versus D 17–18, P 16 respectively) and the coronet is more distinct in *H. tristis* with 5 diverging spines on apex, compared to *H. taeniopterus* with 5 small diverging spines on apex in juveniles, reducing to 3 posteriorly directed spines in adults, and in addition the coronet leans back more in *H. taeniopterus* compared to *H. tristis*. *Hippocampus kelloggi* is a large species, reaching 28 cm in height, occurring in southern Japanese waters and sub-tropical regions of the northern China Seas, but the name is often applied to other Indo-Pacific species that reach a large size.

Material examined. MNHN A4537 & A4538, SYNTYPES, photographs, Melbourne Market, Vic., Australia, 1872. QM I1008, ♂, height 222 mm, Lord Howe I., J.D. Ogilby, 1889. AMS I1959, ♂, height 220 mm, Lord Howe I., E. Saunders, no date. AMS I38517-001, ♂, height 185 mm, off Iluka, NSW, 29°21'S 153°23'E, depth 18–28 m, K. Graham, FRV *Kapala*, 14 Nov 1995. AMS I33593-001, ♂, height 105 mm, off Brunswick, NSW, 28°21'S 153°40'E, depth 53 m, K. Graham, FRV *Kapala*, 10 Nov 1991. QM I3402, ♀, height 170 mm, South Queensland Coast, Qld Fisheries Department, 18 Jun 1919. QM I9726-7(2), ♀ ♀, heights 135 and 145 mm, SE Qld, R. Elks, 6 May 1969. QM I30574 (3), 2 ♀ ♀ & ♂, heights 180–75 mm, Stradbroke I., Qld, 27°29'S 153°31'E, beach washed, M. Mathieson, 3 May 1996.

Hippocampus alatus n.sp.

Winged Seahorse

Fig. 25

Hippocampus sp. 3 Kuitert, 2000, p. 38.

Type material. HOLOTYPE: AMS I20771-102, ♀, height 119 mm, east coast of Cape York, Queensland, 11°37'S 142°56'E, prawn trawl, depth 16–18 m, AIMS-AMS party, 18 Feb 1979. PARATYPES: AMS I15557-077, ♂, height 117 mm, Gulf of Carpentaria, Qld, 17°25'S 140°10'E, prawn trawl, depth 10 m, I.S.R. Munro, 27 Nov 1963. QM I30556, juvenile, height 69.5 mm, Gulf of Carpentaria, NT, 10°03.2'S 137°11.2'E, dredge, depth 42 m, S. Cook & J. Johnson, 21 Nov 1990. QM I27965, juvenile, height 78 mm, Gulf of Carpentaria, Qld, 15°57.6'S 138°41.8'E, dredge, depth 25 m, S. Cook & J. Johnson, 11 Dec 1990. NTM S13267-004, ♀, height 70 mm, Gulf of Carpentaria, Qld, 11°18'S 141°38'E, depth 17 m, R. Williams, 27 Nov 1991. NTM S11580-003, juvenile, height 71 mm, off Dampier Archipelago, WA, 20°03'S 115°48'E, depth 50–53 m, L. Bullard, 8 May 1983. NTM S10959-001, ♀, height 136 mm, off Port Hedland, WA, 18°55'S 119°37'E, depth 80 m, R. Williams, 18 Apr 1983. WAM P28003-001, ♀, height 81 mm, off Monte Bello Is, WA, 20°17'S 116°01'E, depth 55–64 m, *Soela*, 2 Dec 1979.

Diagnosis. Dorsal-fin rays 15–18 (usually 17); pectoral-fin rays 16–18; trunk rings 11; tail rings 34–36; subdorsal spines 2–3/0–0.5, 1, 0–0.5, usually enlarged on 11th trunk ring; nose spine absent; spine above eyes of moderate length, length reaching pupil diameter; lateral head spine large, usually larger than spine above eye; coronet well developed with 5–7 blunt spines, apex rough and rugose; upper shoulder-ring spine at gill opening; lower shoulder-ring spine low and thick, very broad when single or divided into two rounded tips; superior trunk and tail ridges with enlarged spines, forming laterally directed pairs at regular intervals with 2 or 3 on trunk and 3 or 4 on tail, greatly produced in young and least prominent in males; long and sometimes broad dermal flaps, often frilled along edges, on nape, lateral head spines, and enlarged body spines, usually attached posteriorly and just below tip; lateral line with pores on each trunk ring, running just above inferior ridge, continuing on tail to 12th–15th ring.

Description. Head large, 85% of trunk length, snout reaching 11th ring when head against trunk; snout deep, least depth 25% of snout length; dorsal fin with 17 rays (only male paratype with 15, range otherwise 17–18), base short, its length twice its height; pectoral-fin rays 17 (16–18); anal-fin rays 4; trunk rings 11; tail rings 36 (34–36); subdorsal rings 2+1; moderately long spine above eyes, its length about equal to eye pupil, perpendicular to snout; slightly larger lateral head spine, directed laterally, with large dermal flap; moderately large nape spine with dermal flap of similar size; small spine behind eye; low spine below eye; 3 moderately large spines on shoulder ring, uppermost just below gill opening, central spine largest and at level of last pectoral-fin ray, and lowermost double with blunt and rounded tips; coronet distinct with an irregular star arrangement of rugose tipped spines on apex; neck ridge raised centrally with rugose tips and with tubercle at posterior end; superior trunk ridge with enlarged blunt

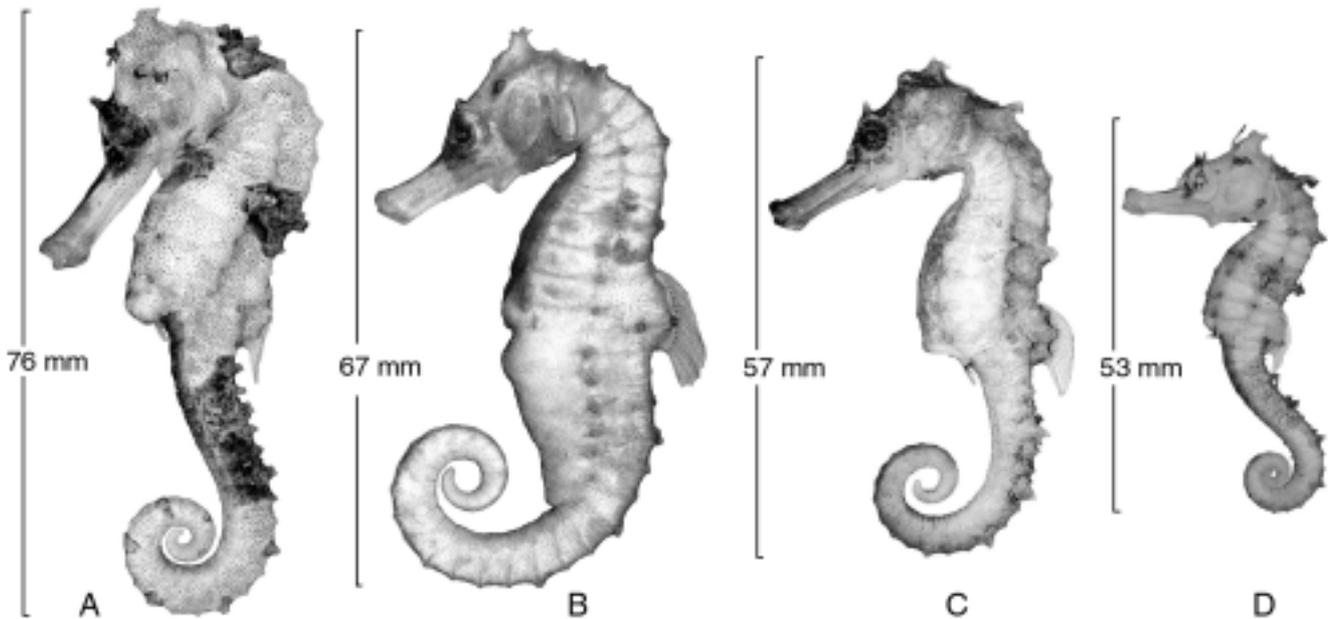


Figure 25. *Hippocampus alatus*. A, holotype, ♀, AMS I20771-102, east coast Cape York, Qld. B, paratype, ♂, AMS I15557-077, Gulf of Carpentaria, Qld. C, paratype, ♀, WAM P28003-001, off Monte Bello Is, WA. D, paratype, juvenile, NTM S13267-004, Gulf of Carpentaria, Qld.

spines on 1st, 4th, 7th and 11th rings, 1st and 4th with dermal flaps; lateral trunk ridge with series of blunt spines beginning on 2nd trunk ring, usually spine on 7th enlarged and with dermal flap; inferior trunk ridge with blunt spines, most prominent on 7–10th ring; ventral trunk spines poorly developed on last few rings; subdorsal spines 3/0,1,0 with central spine on trunk ridge and spine on tail ridge of moderate size (some paratypes with only 2 spines on trunk ridge and one paratype with small spines on nodes beside spine on tail ridge); superior tail ridge with spines of moderate size beginning on 2nd tail ring, gradually becoming progressively smaller to 17th ring, except for enlarged spines bearing dermal flaps on 5th and 8th rings (spines greatly reduced in largest female); inferior tail ridge continues with inferior trunk ridge, with spines becoming progressively smaller posteriorly to 9th ring; lateral line present although pores small and only detectable intermittently to about 12th tail ring (pores distinct in

paratypes). Largest specimen, female, 136 mm in height. Largest male, with fully developed pouch, 117 mm in height. *Colour in life*: (based on colour transparency, taken by Bob Halstead in Milne Bay, Papua New Guinea, of two females). Pale pinkish white with numerous minute dark spots and broad reddish grey saddle-like markings over trunk, on anterior part of tail and around eyes. *Colour in alcohol*: adults pale creamy white with numerous tiny brown spots and dark saddle-like markings on trunk and anterior part of tail around enlarged spines on superior ridges. Dermal flaps dark brown to black.

Distribution (Fig. 26). Northern Australia from the Dampier Archipelago, Western Australia, throughout the Gulf of Carpentaria, to the tip of Cape York, and southeastern Papua New Guinea. Known depth range 10–80 m depth. Soft bottom habitat.

Remarks. This species is named *alatus*, derived from the Latin *alatus*, meaning winged, in reference to the paired spines on the superior trunk ridges that are directed outward and have broad dermal flaps, resembling wings. This feature is most prominent in juveniles and females, and may be less developed in individuals living in deep water. Specimens from Western Australia coming from depths over 50 m have smaller dermal flaps but are located on the same spines as those from shallower depths in the Gulf of Carpentaria. One specimen (NTM S11580-003) lacks the nape spine but has dermal flap development where the spine would be located and may have been damaged at some stage. The lower shoulder-ring spine is normally single, blunt and rounded at the tip, but a secondary spine may develop just in front of it, sometimes only on one side of the head. Adult males are not as spiny as females, and may be smooth on many rings. Because of this species' preferred habitat, specimens in collections have been taken with dredges or prawns trawl. In Papua New Guinea, specimens were found on deep open sand slopes with few sponges

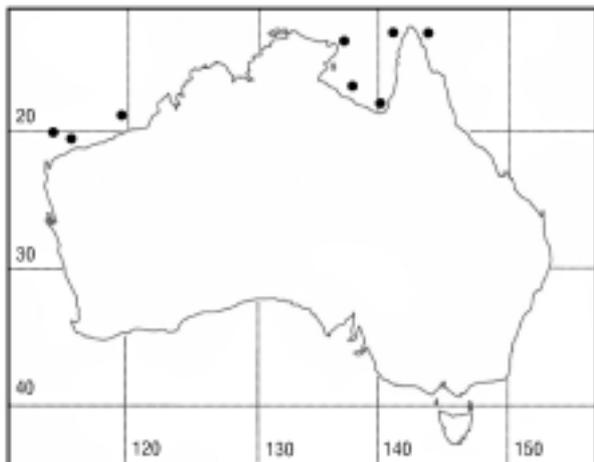


Figure 26. *Hippocampus alatus*. Collection sites of specimens examined.

and gorgonian corals in an area that is influenced by strong tidal currents. *Hippocampus alatus* is most similar to *H. queenslandicus* the main differences between the two involving the development of spines. The tail of *H. queenslandicus* is always spiny, superior ridge with a series of prominent spines present to at least 12th ring, while, in *H. alatus*, the spines in comparative positions are greatly reduced in adults, with prominent spines on the tail spaced at intervals of several rings, in adult as well as juvenile stages.

Specimens comprising the type series were initially identified variously as *H. kuda*, *H. barbouri*?, *H. hystrix* or *H. histrix* and *H. spinosissimus*. Semi-smooth adults were confused with *H. kuda* and small juveniles having a spiny appearance were confused with several spiny species. Though superficially similar, smaller *H. alatus* can be distinguished in lacking a prominent nose spine.

Hippocampus queenslandicus

Queensland Seahorse

Fig. 27

Hippocampus whitei (non Bleeker) Grant, 1987.

Hippocampus queenslandicus Horne, 2001. Off Townsville, Qld.

Diagnosis. Dorsal-fin rays 17 (rarely 18); pectoral-fin rays 17–18 (rarely 16 or 19); trunk rings 11; tail rings 35–36; snout long, its length just over 50% of head length, and deep, its narrowest depth about 30% of its length; spine above eye as long as eye-pupil, directed upward and slightly backwards; nose spine absent and nose profile straight; shoulder ring spines long, uppermost at gill opening, central spine at about level of 13th pectoral-fin ray, lowermost with blunt rounded spine and second less developed spine directed forward; lateral head spine moderately long; coronet small with 5 diverging spines at apex, posterior-

most longest; superior tail ridge spines moderately long, enlarged on 4th, 7th and 10th ring; inferior tail ridge with spines of moderate length along pouch section of males; lateral line distinct with small pores, most on tail associated with double papillae, extending to 16th tail ring. *Fin rays*: dorsal 17 (one with 18); pectoral 17–18 (one with 16/17 and one with 18/19); anal 4. *Rings*: subdorsal 2 + 1; trunk 11; tail 35–36. *Spines or tubercles*: subdorsal 3/0,1,0. Head and body spines short to moderate sized with blunt to sharp tips; spine above eye of moderate size, its length as long as eye-pupil diameter, directed upward and slightly backwards; nose spine absent and nose profile straight (including in juveniles); nape spine small but distinct, perpendicular to nape; spine behind eye small; two spines below eye, low and blunt; shoulder ring spines long, uppermost at gill-opening, central spine at level of about 13th pectoral-fin ray, lowermost with blunt rounded spine and second smaller spine directed forward; lateral head spine of moderately length; neck ridge with a moderate sized spine above gill-opening and a small spine at posterior end of ridge; superior trunk ridge with short but broad-based spines, slightly enlarged at 1st, 4th, 7th and 11th ring; lateral ridge with spines from 2nd to 10th ring, enlarged on 4th, and 7–10th rings; inferior trunk ridge with series of spines on 6th to 11th ring, from short to long respectively; ventral trunk ridge with low angular spines on last 5 rings; superior tail ridge spines moderately long anteriorly, becoming progressively smaller posteriorly to about 16th ring, enlarged on 4th, 7th and 10th rings; inferior tail ridge with spines of moderate size along pouch section of males. *Lateral line*: distinct with small pores, most associated with double papillae on tail, ranging to 16th tail ring. *Coronet*: small with 5 diverging spines at apex, posterior-most longest. *Colour in life*: (based on colour transparencies of living specimens by Mark Norman at James Cook University's Aquaculture Department) Yellow-orange to deep red or dark brown,

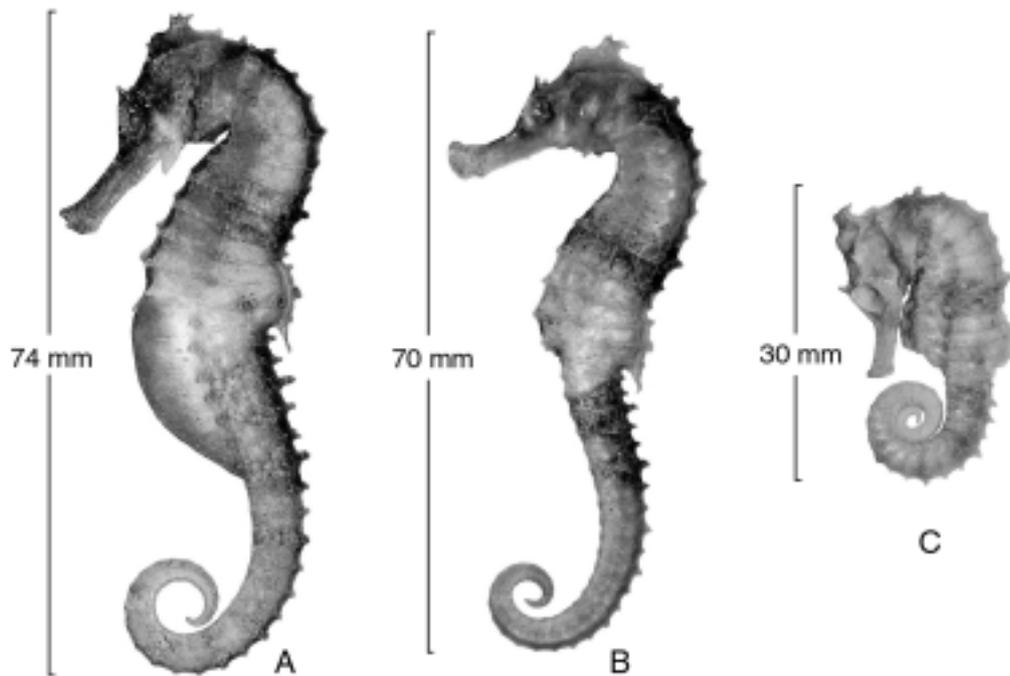


Figure 27. *Hippocampus queenslandicus*. A, ♂, NMV A21578, off Townsville, Qld. B, ♀, NMV A21579, off Townsville, Qld. C, juvenile, AMS I4750, Southport, Qld.

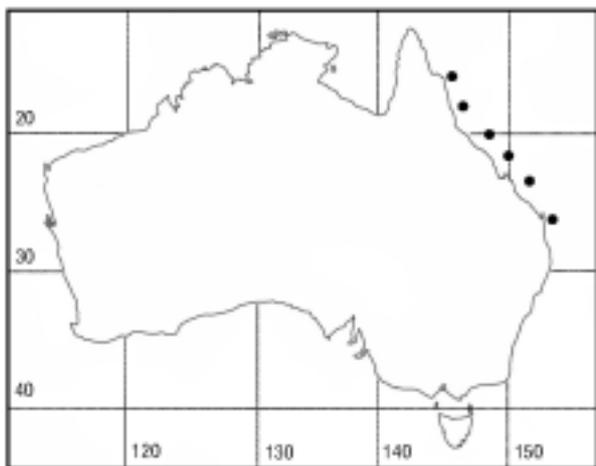


Figure 28. *Hippocampus queenslandicus*. Collection sites of specimens examined.

snout and front of head usually darker or dusky; pale grey saddles or bands with dark margins over trunk and tail, one broadly over first 3 trunk rings, a narrower saddle on 7th ring usually reaching ventral ridge, and one or two broad and narrow saddles anteriorly on tail. *Colour in alcohol*: pale to blackish brown with dusky or grey saddle-like markings.

Measurements. Largest specimen examined 116 mm in height (some specimens observed an estimated 125 mm in height). Head moderately long, 83% of trunk length; snout long, just over 50% of head length and deep, its narrowest depth about 30% of its length.

Distribution (Fig. 28). Inner reef waters of Queensland from Southport north to Princess Charlotte Bay, Cape York. Usually trawled in depths over 20 m, and as deep as 63 m.

Remarks. Specimens of this species were misidentified in collections variously as *Hippocampus hystrix*, *H. kuda* and *H. spinosissimus* depending on their size or sex. *Hippocampus queenslandicus* is one of a number of species in the West Pacific that have spiny juveniles and nearly smooth adults, but adult *H. queenslandicus* usually retain spines anteriorly on the tail. The absence of a nose spine readily distinguishes *H. queenslandicus* from “true” spiny species. The saddle-like markings in *H. queenslandicus* are usually prominent and similar to those of closely related species, but the pattern is also in certain other unrelated species. Colour patterns of closely related species are usually similar, but details may differ between species at certain growth stages or sex that, however small, may represent diagnostic markings. *Hippocampus queenslandicus* appears to be closely related to the stockier *H. alatus*, which has short blunt spines or tubercles on the same rings and ridge nodes that *H. queenslandicus* has long sharp spines. The species differs from *H. semispinosus* in having a shorter, less slender snout, and in colour. In southern Queensland *H. queenslandicus* is replaced by the similar *H. tristis*, a species which lacks spines completely when adult, has more fin rays, grows to almost twice the height, and differs considerably in colour.

Material examined. NMV A21578, ♂, height 116 mm, Britomart Reef, off Townsville, Qld, depth 30–50 m, M.L. Horne, Feb 1999. NMV A21579 (4), ♀♀, height 102–115 mm, Britomart Reef, off

Townsville, Qld, depth 30–50 m, M.L. Horne, Feb 1999. QM I23197, ♀, height 93 mm, NE of Townsville, Qld Fisheries, trawled, 9 Dec 1984. QM I19764, ♀, height 95 mm, Swains Reefs, NE Qld, Qld Fisheries, trawled, Jun 1980. AMS I20959-003, ♀, height 112 mm, Princess Charlotte Bay, Cape York, Qld, 14°09'S 144°04'E, depth 22–28 m, AMS-AIMS prawn trawl, 23 Feb 1979. AMS I4750, juvenile, height 70 mm, off Southport, Qld, 27°S 153°E, depth 27 m, D.F. McMichael, 1960. QM I23060 (2), ♀ & ♂, Swains Reefs, Qld, 20°52'S 150°40'E, depth 63 m, Qld Fisheries, 12 Sep 1986. QM I11770 (2), ♀ & ♂, far north Qld, Challenge Survey, Qld Fisheries, 30 Oct 1957. QM I20492, ♀, Cairns inner reef survey, trawled, Qld Fisheries, 25 Apr 1982. QM I11773 (4), ♀♀, off Cairns, Qld, K. Bryson. AMS I15864-002, ♀, North Keppel I., Qld, 23°05'S 154°45'E, depth 21 m, W. Ponder, 25 Jul 1969.

Hippocampus semispinosus n.sp.

Half-spined Seahorse

Fig. 29

Hippocampus kuda (non Bleeker) Gloerfelt-Tarp & Kailola, 1984.
Hippocampus sp. 2 Kuiter, 2000, p. 36.

Type material. HOLOTYPE: NTM S10749-006, ♀, height 137 mm, east Alas Strait, Indonesia, 08°20'S 116°50'E, trawl, depth 40–60 m, T. Gloerfelt-Tarp, Jun 1981. PARATYPE: NTM S11920-002, ♂, height 120 mm, Timor Sea, southern Indonesia or northern Australia (see remarks), T. Gloerfelt-Tarp.

Diagnosis. Dorsal-fin rays 18; pectoral-fin rays 16–17; trunk rings 11; tail rings 35–36; subdorsal spines 3/0,1,0–0.5, usually enlarged on 11th trunk ring; nose ridge with straight profile and no spine; spine above eyes small, length less than eye diameter, angled back; lateral head spine large, about twice in size of eye-spine, and recurving; small spine behind eye, placed high above eye centre; coronet well developed with 5–7 diverging blunt spines with rugose tips, posterior spines enlarged and recurving; upper shoulder ring spine long, situated at gill opening; lower shoulder-ring spine moderately large, with a poorly developed second spine anteriorly; superior trunk and tail ridges with rugose tubercles, enlarged on 1st and 7th rings as broad spines; superior tail ridge with spines of moderate length from 2nd to about 15th ring, somewhat enlarged on 5th and 8th ring, becoming gradually shorter posteriorly; lateral line with pores intermittently on trunk rings just above inferior ridge, extending onto tail to 17th–18th ring.

Description. Head long, 75% of trunk length, snout reaching 11th ring when head against trunk; snout slender, the least depth 23% of its length, and long, about 55% of head length; dorsal-fin with 18 rays, base short over 2 trunk rings and 1 tail ring; pectoral-fin rays 17 (16–17); anal-fin rays 4; trunk rings 11; tail rings 35 (35–36); subdorsal rings 2 + 1; spine above eyes small, its length less than eye pupil, directed slightly backward; lateral head spine moderately large with a strongly recurving tip; nape spine very small but distinct; a low tubercle behind eye, placed just above ridge junction; no spine below eye; 3 moderately long spines on shoulder ring, uppermost just below gill opening, central spine at ventral level of pectoral-fin base, and lowermost ventrally with a short second spine directed anteriorly from base (on one side only in male paratype); coronet distinct

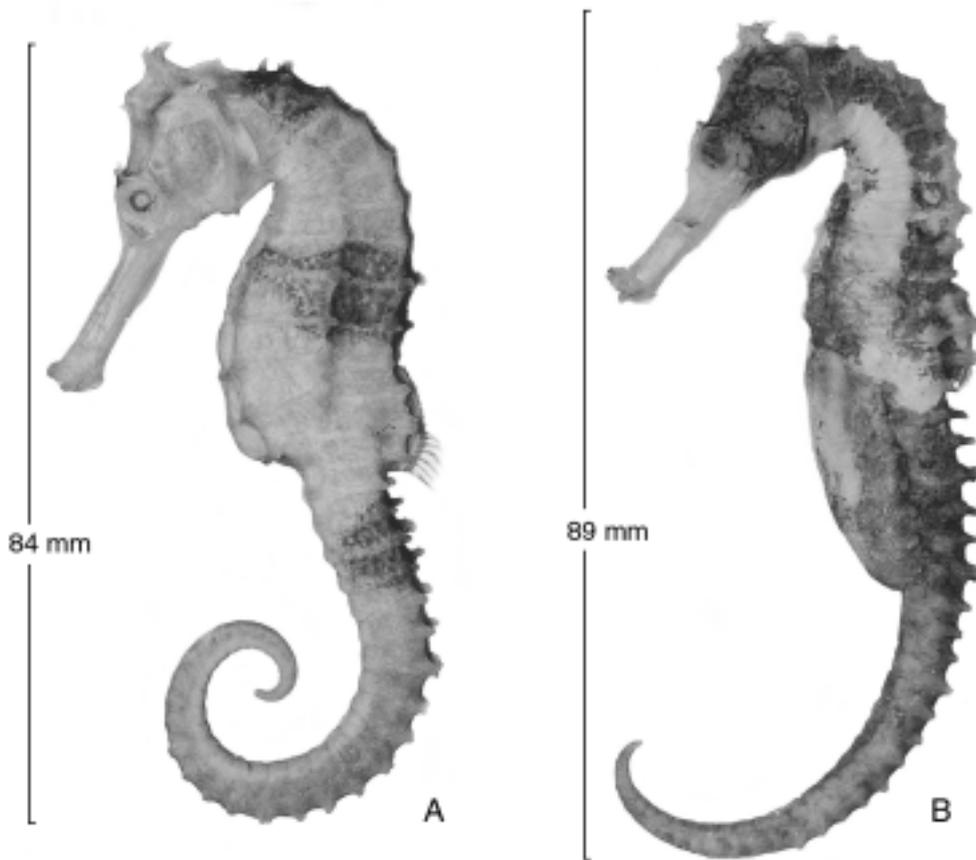


Figure 29. *Hippocampus semispinosus*. A, holotype, ♀, NTM S10749-006, Sumbawa, Indonesia. B, paratype, ♂, NTM S11920-002, southern Indonesia or northern Australia.

with an irregular star arrangement of rugose-tipped spines on apex, posterior spines recurving and central spine enlarged; neck ridge broadly raised above gill-opening with rugose tips, and ending posteriorly with spine-like tubercle; superior trunk ridge with enlarged blunt spines on 1st, 4th, and 7th to 11th rings (least developed in male paratype); lateral trunk ridge with enlarged blunt spines on 2nd, 4th, and 7th to 10th rings; inferior trunk ridge with moderately large blunt spines, mainly developed on 7–11th ring; ventral trunk ridge smooth; subdorsal spines 3/0,1,0.5 with spines on trunk ridge and one on tail ridge of moderate size, followed by small tubercle on first tail ring; anterior superior tail ridge spines, except on first ring, moderately large and blunt, becoming progressively smaller to 17th ring, spines on 5th and 8th rings slightly enlarged; inferior tail ridge continues with inferior trunk ridge, with enlarged tubercles on the first 5–6 rings which become progressively smaller posteriorly; lateral line present but pores difficult to detect and intermittently visible to about 17th tail ring. Largest specimen, female (holotype), 137 mm in height; paratype, male with fully developed pouch, 120 mm in height. *Colour in life*: (based on photo of female holotype illustrated in Gloerfelt-Tarp & Kailola, 1984) deep orange with grey saddle-like blotches over the 1st and 2nd, and 6th to 8th trunk rings, and over 3rd to 5th tail rings; tip of snout pale. Underwater photographs taken in Bali, Indonesia of several females and a male, thought to be this species indicate that females consistently have these markings and range in colour from dark-red to yellow, while at least some males are dark brown with several large creamy-white blotches

laterally on the trunk. *Colour in alcohol*: holotype retains pattern described above, with orange having faded to pale cream. Paratype mostly dark-brown with pale blotches on trunk, and snout and creamy-white pouch.

Distribution. Type material was trawled during a fishery project to assess fish stocks of southern Indonesia and northwestern Australia. The holotype came from a region referred to as “Area B”, ranging from Bali to Timor in the Lesser Sunda Is (Gloerfelt-Tarp & Kailola, 1984). The area was reported as being characterised by narrow and rocky shelves surrounding each of the islands. Habitats in the region vary greatly from narrow passages with strong currents to large areas with muddy substrates. The paratype came from an assortment of fishes collected from 1980–1983 for which no data were recorded (Helen Larson, pers. comm.). A discrepancy exists between data presented in Gloerfelt-Tarp & Kailola (1984), their station TGT 1813 and that accompanying the holotype, NTM S10749-006, although longitudes and latitudes are close, Gloerfelt-Tarp & Kailola (1984) state that this species occurs in Areas B, C, where C is off northwestern Australia. The registration information for NTM S10749-006 is considered here as the correct type locality description. It is possible that the locality provided by Gloerfelt-Tarp & Kailola (1984) may be that of the paratype. Still, a description of this species is presented here as there is a chance that the paratype was collected on the northwest shelf of Australia.

Remarks. This species is named *semispinosus* in reference to its spiny appearance that is intermediate between smooth

and long-spined species. The female holotype was originally identified as *Hippocampus kuda*, and male paratype as *H. spinosissimus*, which are “smooth”, and “spiny” species respectfully. It is most similar to *H. moluccensis* (Bleeker, 1852b), a species described from Ambon. Two specimens NMV 46228 a male and NMV 46227 a female, apparently Bleeker’s types of *H. moluccensis* (they match his description exactly), have saddle-like colour patterns like *H. semispinosus*, but the head and body of these specimens are peppered with small dark spots as in *H. alatus*. *Hippocampus moluccensis* differs morphologically from *H. semispinosus* in having fewer dorsal-fin rays, (16–17 versus 18); a shorter snout, (length 2 or more times head versus 1.8 times head or less) and differs from *H. alatus*, *H. queenslandicus*, *H. tristis* in having a raised and angled nose profile versus one that is straight. *Hippocampus semispinosus* has a longer and more slender snout than *H. alatus* and *H. queenslandicus* (snout longer than 1/2 head-length, and snout-depth 5× in its length, versus snout about 1/2 head-length, and snout-depth 3.5–4× in its length). Except for the saddle-like marking of the female holotype, this species differs considerably in colouration from *H. alatus* and *H. queenslandicus*.

Hippocampus abdominalis

Eastern Potbelly Seahorse

Fig. 30

Hippocampus abdominalis Lesson, 1827. New Zealand.

Diagnosis. Dorsal-fin rays 25–28; pectoral-fin rays 15–16 (usually 15); trunk rings 12–13; tail rings 44–45; subdorsal spines 4/0,0,1,1 or 5/0,0,1,1,1; head small, 62–77% of trunk (adult–juvenile respectively); snout usually short, 31–37%

of head (adult–juvenile respectively). *Fin rays:* dorsal 25–28; pectoral 15–16 (usually 15); anal 4. *Rings:* subdorsal 3–4+1–2; trunk 12–13; tail 44–45. *Spines or tubercles:* subdorsal 4/0,0,1,1 or 5/0,0,1,1,1. Pelagic young with low angular spines along trunk and anterior tail ridges. Spines becoming progressively smaller in post-pelagic young and remain as low rugose tubercles in large adults. Tubercles enlarged above eyes, on trunk mainly below the dorsal fin, and along shoulder ring at gill-opening with one of moderate size ventrally. *Lateral line:* small pores with low papillae, usually indistinct and only detectable intermittently posteriorly to about 30th tail ring (in one female they are clearly visible on nearly all rings to 36th tail ring). *Coronet:* very low with rugose apex in adults. *Colour in life:* bony-white, grey, yellow or brown, usually with black spots on head and trunk. Those in shallow bays usually brown with many dark spots, whilst those from deep water plain but with brighter colours similar to living sponges. *Colour in alcohol:* pale brown, plain to spotted on head and trunk and sometimes with indistinct banding on tail.

Measurements. Largest specimen examined 165 mm in height, but probably reaching 18 cm. Head small, ranging from 62 (adult) to 77% (juvenile) of trunk. Snout usually short, ranging 31–37% of head.

Distribution (Fig. 31). An east coast species, the most northern record, based on photographs, is off Newcastle, NSW (about 32°S), and the southern extent of the range is Eden, NSW, but with pelagic young *Hippocampus abdominalis* can be expected further south and possibly overlaps in range with the southern form, *H. bleekeri*. Adults occur in shallow estuaries, usually on low reef habitats with kelp *Ecklonia radiata* or in deep tidal channels where they usually cling to sponges, and coastal reefs where they are usually in depths over 20 m.

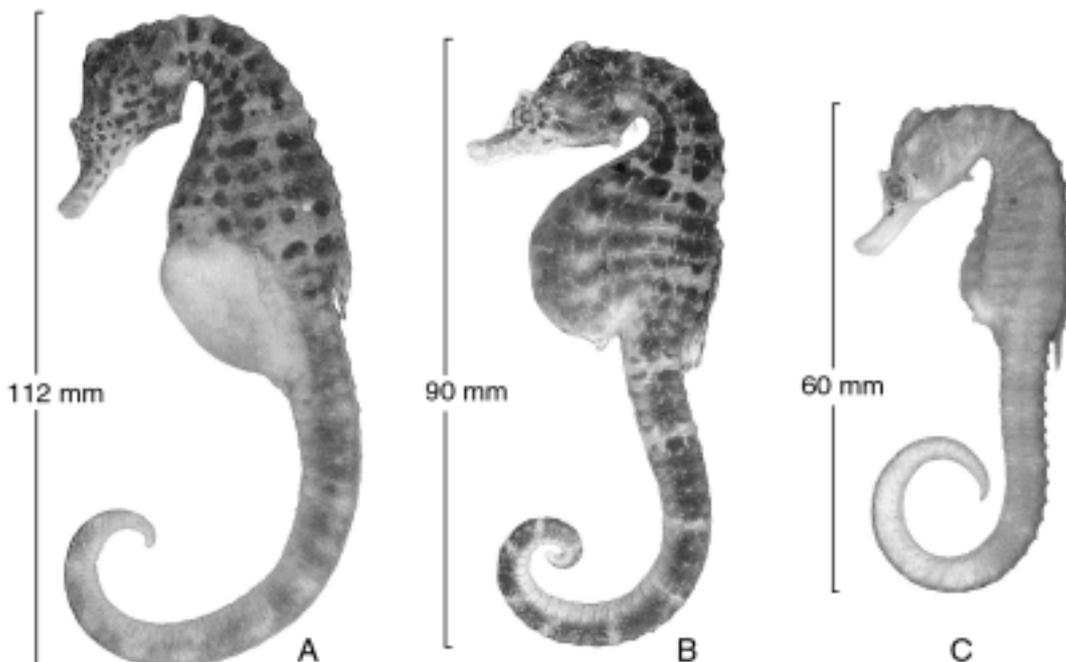


Figure 30. *Hippocampus abdominalis*. A, ♂, AMS I15657-001, Ship Rock, Sydney, NSW. B, ♀, AMS I16791-002, Long Bay, Sydney, NSW. C, juvenile, AMS I17670-001, Long Bay, Sydney, NSW.

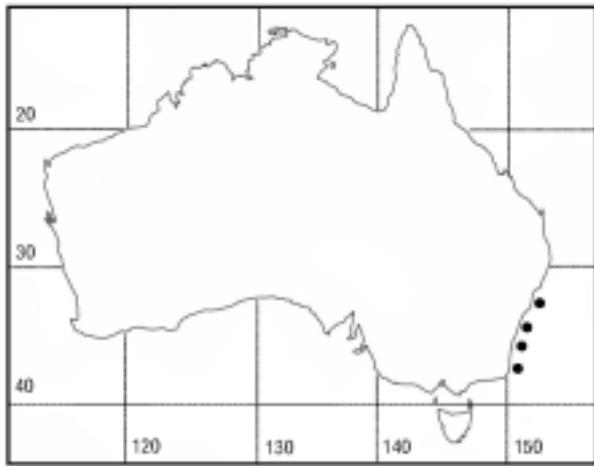


Figure 31. *Hippocampus abdominalis*. Collection sites of specimens examined and localities of specimens photographed underwater.

Remarks. This species, featuring small head and short snout, is tentatively identified as *Hippocampus abdominalis*, a species that was originally described from New Zealand. *Hippocampus abdominalis* differs from the very closely related *H. bleekeri* in having a smaller head and much shorter snout. It is also less spiny and lacks a nape spine. The pectoral fin count in *H. abdominalis* is lower than in specimens *H. bleekeri* from South Australia found at similar latitudes. Adults usually lack dermal appendages on head that are nearly always present in large *H. bleekeri*. However, the absence or presence of such appendages may be habitat related. To validate the identity of the New South Wales population, the New Zealand populations of *H. abdominalis* need to be studied, as there appears to be more than one species there.

Material examined. AMS I13696, ♀, height 135 mm, Millers Point, Sydney, 33°51'S 151°13'E, E. Briggs, 1916. AMS I15657-001, ♂, height 165 mm, Ship Rock, Port Hacking, Sydney, 34°04'S 151°09'E, depth 10 m, Neville Coleman, 1 Mar 1970. AMS I16791-002, ♀, height 150 mm, Long Bay, Sydney, 33°45'S 151°20'E, R. Kuitert, 25 Nov 1972. AMS I17670-001, ♀, height 90 mm, Long Bay, Sydney, 33°45'S 151°20'E, R. Kuitert, 21 Jan 1974. AMS I21893-001, juvenile, Botany Bay, Sydney, 33°59'S 151°12'E, NSW Fisheries, 1980. AMS IA5888, juvenile, Maroubra, Sydney, 33°57'S 151°16'E, G. Bunt, 1933.

Hippocampus bleekeri

Southern Potbelly Seahorse

Fig. 33

Hippocampus (Macleayina) bleekeri Fowler, 1907. Victoria, Australia.
Hippocampus (Macleayina) agnesae Fowler, 1907. Victoria, Australia.
Hippocampus graciliformes McCulloch, 1911. Near Bass Strait, Victoria, Australia.

Hippocampus abdominalis (non Lesson) Paxton *et al.*, 1989: in part.
Hippocampus abdominalis (non Lesson) Lourie *et al.*, 1999: in part.

Diagnosis. Dorsal-fin rays 27–30; pectoral-fin rays 14–16 (usually 15 in Victoria and 16 in South Australia); trunk rings 12–13 (usually 13); tail rings 44–48; subdorsal spines 5–6/0.0.3–4; head of small to moderate size, ranging from

73% (juvenile) to 80% (adult) of trunk; snout usually short, 40–50% of head; small nape spine present and adults usually with long dermal filaments on various head spines. *Fin rays:* dorsal 27–30; pectoral 14–16 (usually 15 in Victoria and 16 in South Australia). *Rings:* subdorsal 4–5+1–2; trunk 12–13 (usually 13); tail 44–48. *Spines or tubercles:* subdorsal 5/0,0,1,1,1 or 6/0,0,1,1,1,1. Pelagic young with angular spines of moderate length along trunk and anterior tail ridges. Spines diminishing in relative size in post-pelagic young, becoming low to moderately large rugose tubercles in adults; tubercles raised at various points, above eyes, along shoulder ring with upper tubercle at gill-opening and moderately large lower tubercle positioned ventrally, and those on the trunk mainly enlarged below dorsal fin. Small nape spine present. Adults usually with long dermal filaments on various head spines. *Lateral line:* pores usually small, but distinct, visible intermittently on tail to about 25th tail ring. *Coronet:* Very low with rugose ridges and 2 blunt spines posteriorly in some adults. *Colour in life:* usually grey or pale brown to yellow, occasionally bright orange. Tasmanian population with numerous spots on head and trunk; South Australian population with few black spots, often mostly absent from head; and Victorian population with variable number of black spots, usually most numerous on head. Tail often with pale bands centred on about every 5th ring in dark individuals. *Colour in alcohol:* cream to pale brown, retaining dark spots from life, though faded to pale or dark brown.

Measurements. Largest specimen from Victoria examined, female, 230 mm height, and South Australian, female, 225 mm height. Snout length 40–50% of head length, and head length 73–80% of trunk length.

Distribution (Fig. 32). Known from the northern Great Australian Bight, SA, to off Lake Entrance, Victoria and the Derwent Estuary, Tasmania. It occurs in shallow estuaries and reefs in coastal waters to a depth of at least 35 m. Usually seen clinging to holdfast of *Ecklonia radiata* and sponges, but also man-made items that provide anchorage in currents, ranging from robes and shopping trolleys to shipwrecks.

Remarks. *Hippocampus bleekeri* is very similar to *H. abdominalis* from New South Wales and New Zealand, and

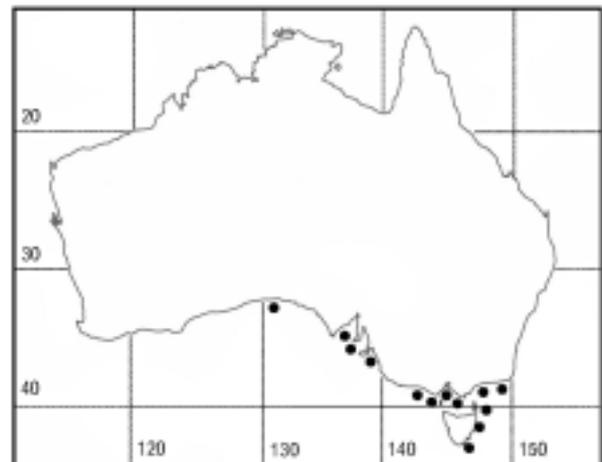


Figure 32. *Hippocampus bleekeri*. Collections sites of specimens examined and localities of specimens photographed underwater.

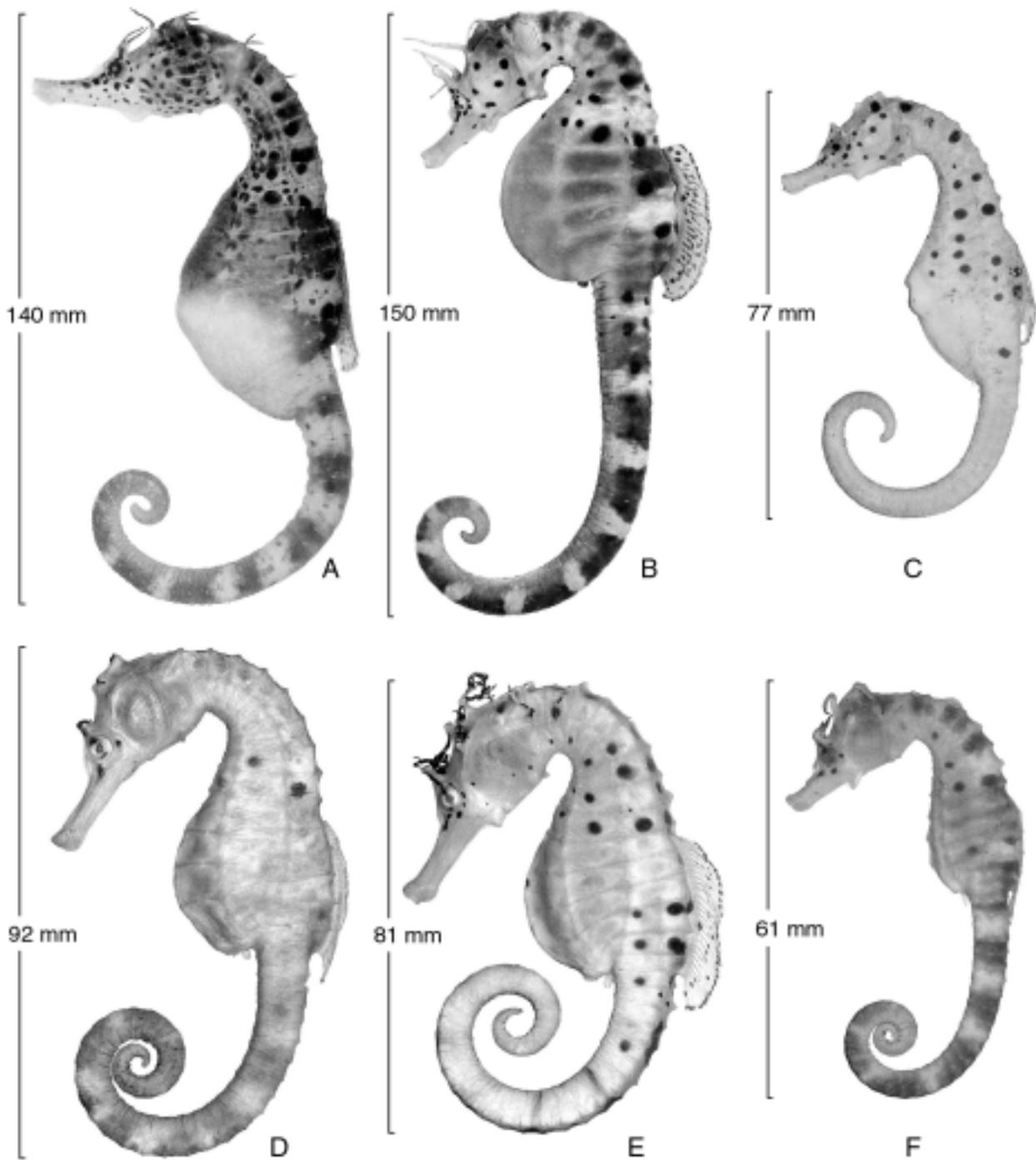


Figure 33. *Hippocampus bleekeri*. A, ♂, NMV A17231, Port Phillip Bay, Vic. B, ♀, NMV A2335, Wilsons Promontory, Vic. C, ♂, NMV A8904, Lakes Entrance, Vic. D–F, ♀♀, SAMA F5335, upper Spencer Gulf, SA.

differs from it in having a larger head and longer snout. In contrast to *H. abdominalis*, whose snout shortens proportionally with age to less than one-third head length, the snout in *H. bleekeri* elongates with growth to half head length. *Hippocampus bleekeri* has better developed spines at all stages and commonly has long filaments extending from its head spines. In the cooler waters of Tasmania this species grows larger and usually has more fin-elements than those from the mainland. This taxon is in need of further study to determine if populations in the areas of South Australia, Victoria and Tasmania represent a single species.

Material examined. SAMA F6221, ♀, height 225 mm, Douglas Bank, Spencer Gulf, SA, D. Graske, 12 Nov 1985. SAMA F5335 (3), ♀♀, height 98–168 mm, Upper Spencer Gulf, SA, trawled MRV NGRIN, Terry Sim, 8 Nov 1985. SAMA F3885, juvenile, height 72 mm, northern Great Australian Bight, SA, SA Fisheries, 5 May 1973. NMV A2899, juvenile, height 46 mm, Port Phillip Bay, Vic., in floating seagrass, R. Kuitert, 28 Apr 1983. NMV A8904, ♂, height 122 mm, Lakes Entrance, Vic., 37°53'S 148°00'E, depth 32 m, W. French, September 1948. NMV 17231 (3), ♂, 2 ♀♀, heights 200 & 250 mm respectively, Geelong, Vic., 38°05.4'S 144°23.2'E, R. Ickeringill & T. Bardsley, Dec 1995. NMV 17242 (2), ♀♀, heights 200–230 mm, Geelong, Vic., 38°06.8'S 144°21.9'E, M. Lockett & M. Gomon, 1 Feb 1996.

Hippocampus zebra

Zebra Seahorse

Fig. 34

Hippocampus zebra Whitley, 1964. Swain Reefs, Queensland, Australia.

Diagnosis. Dorsal-fin rays 17–18; pectoral-fin rays 15–16; subdorsal rings 2–3+1; body and head covered by alternating white and brown to black bands; coronet of moderate height, with 5 spines at apex; upper shoulder-ring spine near pectoral fin base. *Fin rays:* dorsal 17–18; pectoral 15–16; anal 4. *Rings:* subdorsal 2–3 + 1; trunk 11; tail 37–39. *Spines or tubercles:* subdorsal 3–4/0,1,0–0.5. Spine above eye of moderate length; nape spine small, directed upward; nose profile straight; 3 small shoulder-ring tubercles or spines, upper two as tubercles, situated at level of either end of pectoral-fin base, none at gill-opening, and lowermost as small spine; lateral head spine low; trunk tubercles along dorsal and lateral ridges of small to moderate size, some enlarged and pointed, especially beside dorsal fin and on anterior part of superior tail ridges, becoming progressively smaller posteriorly. *Coronet:* of moderate height, with 5 spines on apex, posterior 3 directed backward. *Colour in life:* (from Whitley, 1964): “yellowish-white and dark brown bands, most of them transverse, but some oblique or curved on the head and belly, the whole forming a very beautiful and strongly contrasting arrangement with a tendency for broad and narrow bands to alternate. Eye blue with yellowish-white iris. Chin yellowish-white, without dark bands. Fins lighter; dorsal and anal fins brown proximally”. *Colour in alcohol:* as in life, with alternating bands white to brownish-white and dark brown to black.

Measurements. Largest specimen examined with height of 90 mm. Length of tail about 60% of height; trunk length about 36% of height; head length about 74% of trunk length. Males with deeper trunk than females, the depth in males is about 80% and in females about 60% of head length. Length of snout slightly less than half head length.

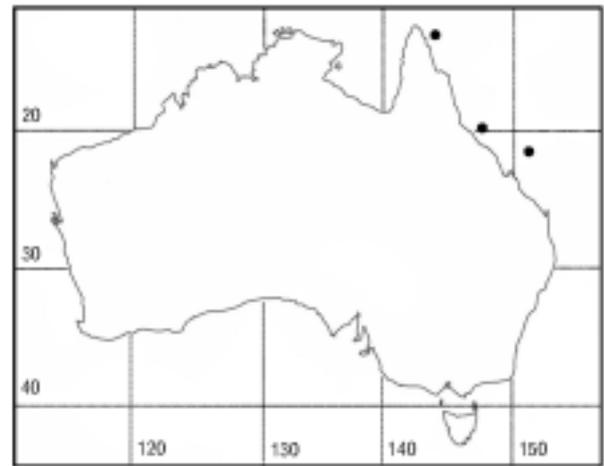


Figure 35. *Hippocampus zebra*. Collection sites of specimens examined.

Distribution (Fig. 35). Only known from off the Queensland coast and Milne Bay, southeastern Papua New Guinea (based on photograph). *Hippocampus zebra* is known from a depth range of about 20–60 m depth. Soft bottom habitat, probably on black coral or gorgonians.

Remarks. Whitley’s paratype (AMS IB2819) of *Hippocampus zebra* from Moreton Bay is a specimen of the “zebra” form of *H. dahli* (identified as *H. planifrons* by Johnson, 1999). Although the zebra-like colour pattern of *H. zebra* is distinctive, the sympatric *H. dahli* can have similar body patterns, though with finer stripes and a plain snout. *Hippocampus zebra* also has a taller coronet, and the upper tubercle on the shoulder ring is near the pectoral-fin base rather than near the gill-opening as in *H. dahli*.

Material examined. AMS IB6015, X-ray of HOLOTYPE, off Gillett Cay, Swain Reefs, Qld, dredge 38 fm, Australian Museum 1962 Swain Reefs Expedition, 19 Oct 1962. QM I29845, ♂, height 58 mm, Cape Grenville, NE Qld, 11°55’S 143°55’E, trawl 20 m, S. Cook, 21 Nov 1993. James Cook University, photographs of unregistered specimens (2), ♂ & ♀, heights c. 70 mm, off Townsville, trawl, M.L. Horne, 1999.

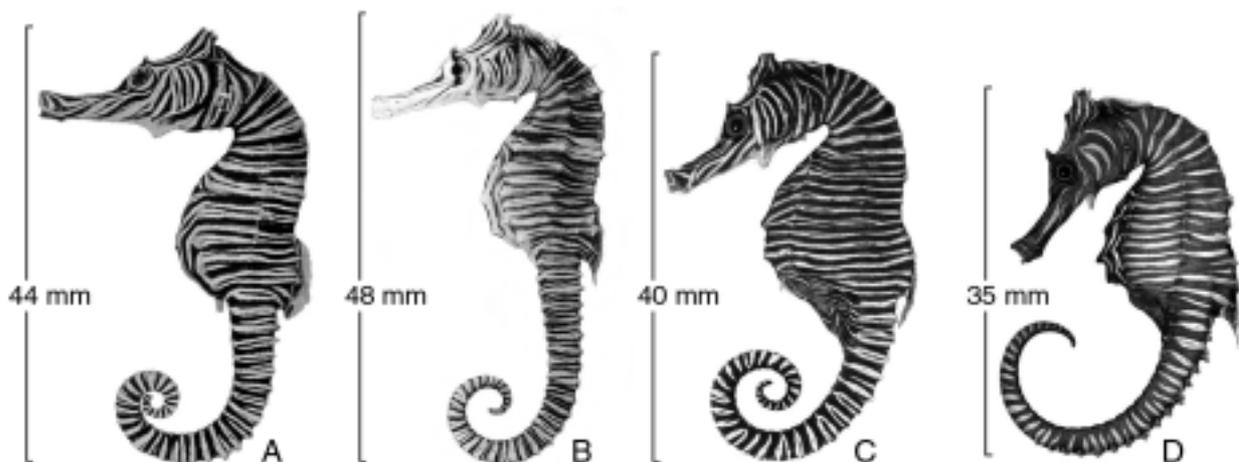


Figure 34. *Hippocampus zebra*. A, ♀, holotype, AMS IB6015, Swain Reefs, Qld, photo by Anthony Healy, Australian Museum. B, ♀, James Cook University unregistered, off Townsville, Qld. C, ♂, unregistered, off Townsville, Qld. D, ♂, QM I29845, Cape Grenville, Qld.

Hippocampus montebelloensis n.sp.

Monte Bello Seahorse

Fig. 36

Type material. HOLOTYPE: NTM S10804, height 48 mm, juvenile, off Trimouille Island, Monte Bello Islands, Western Australia, 20°24'S 115°34'E, H. Larson and party, 21 Apr 1983. PARATYPE: WAM P29078-001, height 78 mm, ♀, Exmouth Gulf, WA, 22°00'S 114°20'E, trawl *Dorothea*, 1 Oct 1962.

Diagnosis. Dorsal-fin rays 18–19; pectoral-fin rays 15–16; trunk rings 11; tail rings 37; subdorsal spines 3/0,1,0; spine above eye of moderate size, length about pupil-diameter, slightly angled back; moderately large and recurving lateral head spine; long, forward directed nape spine; nose-profile straight; coronet moderately high, with spines on corners, posterior 3 largest and directed backward; 3 spines of moderate size on shoulder ring, uppermost and central spines at ends of pectoral-fin base, lowermost ventrally; superior trunk ridge sharp-edged with spines of small to moderate size on rings 1, 4, 7 and 11, extended by long dermal flaps at spine tips in holotype; superior tail ridge similar to superior trunk ridge, with enlarged spines at regular intervals, becoming progressively smaller posteriorly.

Description. Head large, length 95% (90%) of trunk length; snout long, 55% (50%) of head length; dorsal fin with 19 (18) rays, its base over 2 trunk and 1 tail ring; pectoral-fin rays 15 (16); trunk rings 11; tail rings 37; moderately long spine above eyes; tiny spine behind eye; large lateral head spine, slightly recurving; long nape spine with filamented tip, perpendicular to head profile; nose profile straight, without spine, rising from snout at 45° angle; 2 low angular spines below eye; 3 spines of moderate length on shoulder ring, uppermost and central spines at ends of fin base,

lowermost positioned ventrally; coronet moderately high, with 5 flat spines at apex, posterior 3 directed backward, central spine enlarged; neck-ridge straight with 2 angular spines, one above gill-opening and one at posterior end; superior trunk ridge with moderately long spines, spines enlarged with filament at tips on rings 1, 4, 7 and 11; lateral trunk ridge with series of spines from 2nd to 10th rings, first small, progressively increasing in size to spines that are of moderate length and blunt; inferior trunk ridge moderately developed with downward directed blunt angular spines; ventral trunk with low downward directed spines; subdorsal spines 3/0,1,0; superior tail ridge with enlarged spines and filamentous tips on every 3rd ring, starting with 4th (5th in paratype), becoming progressively shorter; inferior tail ridge continuous with trunk ridge, tubercles becoming progressively smaller posteriorly; lateral line present with pores detectable to about 14th tail ring. Largest specimen, a female, 78 mm in height. *Colour in life*: unknown. *Colour in alcohol*: mainly pale brown with fine darker brown striations along the head.

Distribution (Fig. 37). Only known from Monte Bello Is and Exmouth Gulf in Western Australia. Holotype caught at surface at night, clinging to *Sargassum* fragment with boat anchored in 5 m of water (Helen Larson, pers. comm.). No other details recorded for paratype.

Remarks. This species is named *montebelloensis* in reference to its type locality. Its closest relative appears to be *Hippocampus zebra*, with which it shares the same meristics and morphology. The superficially similar *H. alatus*, occurring in the same region, is readily distinguished from *H. montebelloensis* in having its upper shoulder-ring spine near the gill-opening rather than near the pectoral-fin base. It is likely that the paratype is close to the maximum size of this species.

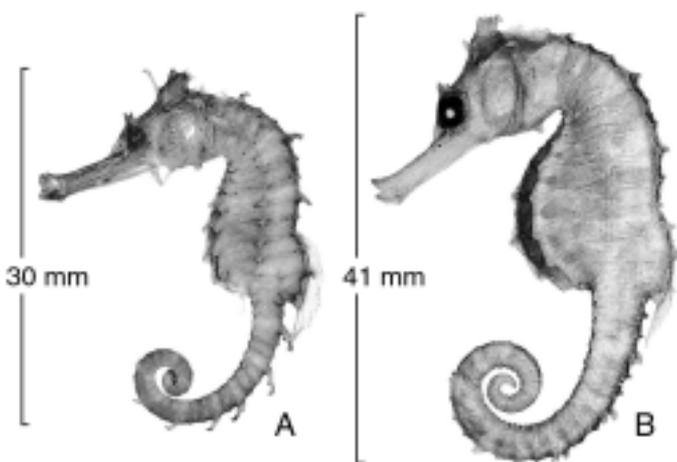


Figure 36. *Hippocampus montebelloensis*. A, juvenile, holotype, NTM S10804, Monte Bello Is, WA. B, ♀, WAM P29078-001, paratype, Exmouth Gulf, WA.



Figure 37. *Hippocampus montebelloensis*. Collection sites of specimens examined.

Hippocampus whitei

White's Seahorse

Fig. 38

Hippocampus whitei Bleeker, 1855. Sydney, Australia.
Hippocampus novae Hollandiae Steindachner, 1866. Sydney, Australia.

Diagnosis. Dorsal-fin rays 16–17 (usually 17); pectoral-fin rays 15–17 (usually 16); tail rings 33–34; coronet height moderate to tall, angled back, its spines small and blunt in young and further reduced in large adults, arranged in five pointed star at apex, with additional 2 or more small spines anteriorly on base; neck-ridge spines absent. *Fin rays:* dorsal 16–17 (usually 17); pectoral 15–17 (usually 16); anal 4. *Rings:* subdorsal 2 + 1; trunk 11; tail 33–34. *Spines or tubercles:* subdorsal 3/0,1,0. Spine of moderate size above eye; nape spine small; shoulder-ring spines of moderate size in 3 locations, one near each end of pectoral-fin base but none at gill-opening, and lowermost double with sub-equal spines; lateral head spine low; body tubercles of small to moderate size along dorsal and lateral ridges, some enlarged and pointed, especially on 8th trunk ring, below dorsal fin and on following part of superior tail ridges; neck-ridge spines absent. *Coronet:* height moderate to tall, angled back, its spines small and blunt in young and further reduced in large adults, arranged in five pointed star at apex, with additional 2 or more small spines anteriorly on base. *Colour in life:* mostly pale to dark brown and almost black, with fine pale spots or striations, and sometimes entirely yellow. Often saddle-like markings at 1st, 4th and 8th trunk rings, and on tail rings where spines are enlarged. Top of snout finely barred with dusky lines, lines broader near eyes. Nose spine and adjacent area pale. *Colour in alcohol:* brown with blackish-brown scribbles and blotches.

Measurements. Height of largest examined specimen 103 mm. Length of tail about 66% of height; trunk length about



Figure 39. *Hippocampus whitei*. Distribution based on specimens examined and localities of specimens photographed underwater.

33% of height; head length about 90% of trunk length. Length of snout about 42% of head length.

Distribution (Fig. 39). Apparently restricted to New South Wales, though the northern extent of its range is uncertain. Common in estuaries and harbours in Sydney and Newcastle regions.

Remarks. No types of *Hippocampus whitei* are known. Bleeker's description is based on fig. 2 (plate opposite p. 264 in J. White, 1790) from New South Wales. White's figure shows a stylized seahorse with a distinct coronet with at least three blunt spines (J.M. Leis, pers. comm.). Only two seahorse species are known to occur in the vicinity of Sydney: *H. abdominalis* and *H. whitei*. *Hippocampus whitei* has a well-developed coronet with blunt spines whereas *H. abdominalis* adults have no coronet. There can be no doubt that White illustrated the most common seahorse species in Sydney Harbour and Botany Bay, thus maintaining the traditional usage of the name.

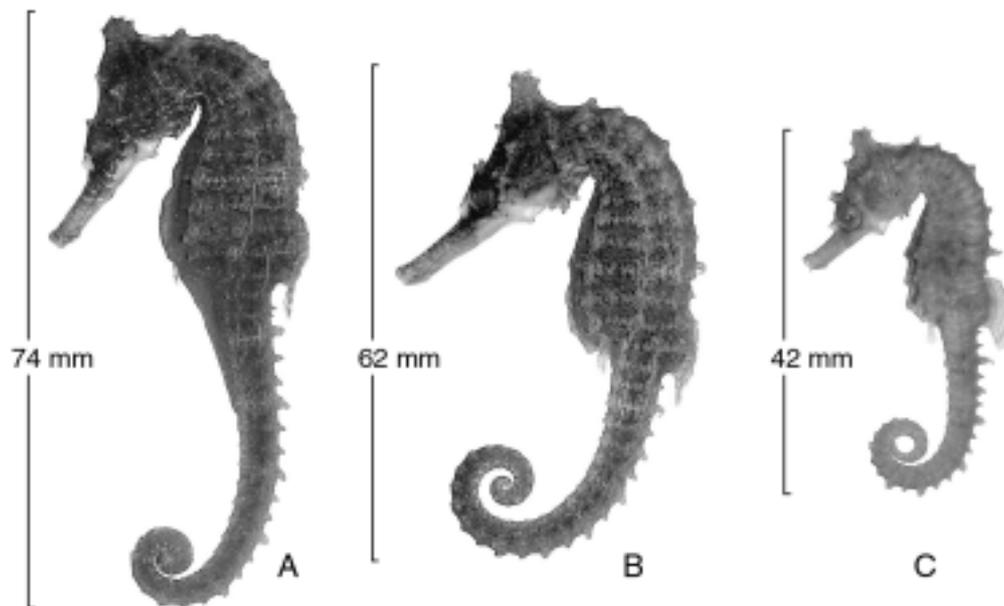


Figure 38. *Hippocampus whitei*. A, ♂ AMS I19900-002, Sydney Harbour, NSW. B, ♀, AMS I19900-002, Sydney Harbour, NSW. C, juvenile, AMS I18809-001, Sydney Harbour, NSW.

Many specimens in the various Australian institutions registered as *H. whitei* represent other species: those from northern New South Wales are *H. tristis*, those from southern Queensland are *H. tristis* and *H. procerus*, while those from Victoria and South Australia are juvenile *H. breviceps*. Although specimens from South Australia of *H. whitei* were not found in collections, the origin of the records from that state was not determined. There is a slight possibility of its existence in the upper Spencer Gulf (other Australian east coast species have a disjunct distribution there). *Hippocampus whitei* is distinguished from *H. tristis* and *H. breviceps* in having its upper shoulder-ring spine near the pectoral-fin base rather than near the gill-opening. *Hippocampus whitei* is very similar to *H. procerus*, differing from it in lower meristics, lower coronet and generally a less spiny physiogamy.

Material examined. AMS I19900-002 (2), heights 94–96 mm, Spit Bridge Marina, Sydney Harbour, 33°48'S 151°14'E, Macquarie University, class, 2 m, 8 Aug 1976. AMS I18809-001, height 65 mm, Pilot Station, Watsons Bay, Sydney Harbour, 33°50'S 151°16'E, 3 m, R. Kuiter, 20 Mar, 1976. AMS I19901-027 (3), heights 75–95 mm, Neilsen Park, Sydney Harbour, 33°51'S 151°16'E, 5 m, Macquarie University, class, 8 Aug 1976. AMS I38991-003, height 60 mm, Georges River, Botany Bay, 34°01'S 151°09'E, Lockett & Upston, 4 Mar 1998. AMS IA151, height 103 mm, Domain Baths, Woolloomooloo, Sydney Harbour, 33°53'S 151°13'E, R. Gaul, 1921.

Hippocampus procerus n.sp.

High-crown Seahorse

Fig. 40

Hippocampus whitei (non Bleeker) Paxton *et al.*, 1989: in part.
Hippocampus whitei (non Bleeker) Johnson, 1999.
Hippocampus whitei (non Bleeker) Lourie *et al.*, 1999: in part.

Type material. HOLOTYPE: AMS E2914, ♀, height 110 mm, 5–11 km NW Hervey Bay, Fairway Buoy, Queensland, 24°S 152°E, FIS *Endeavour*, 7 Jul 1910. PARATYPES: QM I2208, juvenile, height 55 mm, Norman River, Gulf of Carpentaria,

Qld, C. Taylor, 3 Nov 1914. QM I8792, ♂, height 98 mm, off Redcliffe, SE Qld, N. Phillips, 24 Jul 1965. QM I11000 (7), heights 56–96 mm, Moreton Bay, Qld, T.C. Marshall, 24 Oct 1950. QM I13012, ♂, height 75 mm, off Redcliffe, SE Qld, trawl 5 fm, R.J. McKay, 17 Mar 1975. QM I29963, ♀, height 65 mm, Newport Canal mouth, Deception Bay, Moreton Bay, Qld, 27°12'S 153°06'E, trawl, I. Halliday, 1991. QM I30772, ♀ & ♂, heights 75 & 95 mm respectively, off Chain Banks, Moreton Bay, Qld, J. Johnson, depth 3–7 m, 24 Jan 1997. AMS I492, ♀, height 94 mm, Moreton Bay, Qld, 27°25'S 153°20'E, J.D. Ogilby, 1886. AMS I12554, ♂, height 105 mm, Moreton Bay, Qld, 27°00'S 153°00'E, Amateur Fishermans Association of Qld, 1912. AMS IA4205, juvenile, height 57 mm, Port Curtis, Qld, 23°55'S 151°23'E, dredged, M. Ward & W. Boardman, 14 Dec 1929. AMS IB1011, ♀, height 105 mm, east of Burnett River, Qld, 24°S 152°E, dredged, CSIRO, 14 Sep 1938.

Diagnosis. Dorsal-fin rays 17–19 (rarely 17); pectoral-fin rays 16–18 (rarely 16, usually 18); trunk rings 11; tail rings 34–35; subdorsal spines 3/0–1,1,0–1; spines of moderate size at nose, above eyes, and laterally on head; coronet tall and strongly angled back, with 5 large spines at apex and additional spines on anterior face; neck ridge with low spines, one centrally and one at posterior end.

Description. Head long, 85% of trunk length; snout long, 47% of head length; dorsal-fin rays 18 (17–19, one paratype with 17), its base over 2 trunk and 1 tail ring; pectoral-fin rays 18 (16–18, rarely 16, usually 18); trunk rings 11; tail rings 35 (34–35); spine with length of pupil diameter above eyes; lateral head spine of moderate length, directed laterally outwards; small spine perpendicular to nape; spine of moderate length behind eye; 2 separate low spines below eye; shoulder-ring spines of moderate length, uppermost near top of pectoral fin base, central spine near bottom of pectoral fin base, and lowermost double and positioned ventrally, the more anterior of the two small and less developed (absent in some paratypes on one or both sides); coronet tall, angled backward with 5 flanged and pointed spines on apex in star-like arrangement, and small spines

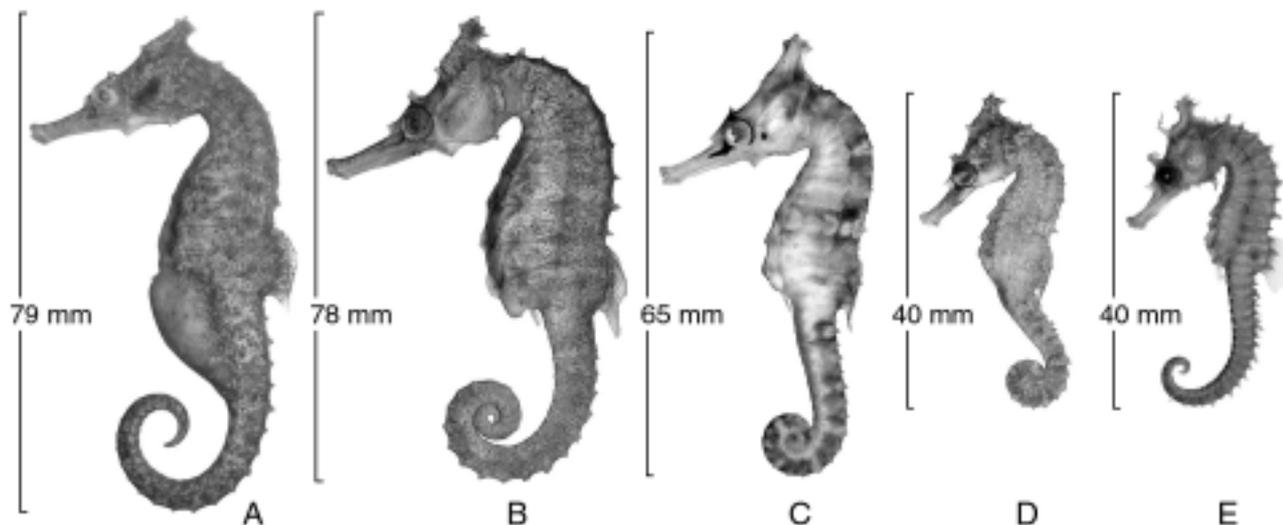


Figure 40. *Hippocampus procerus*. A, ♂, paratype, QM I8792, off Redcliffe, SE Qld. B, ♀, holotype, AMS E2914, Hervey Bay, Qld. C, ♀, paratype, QM I30772, Moreton Bay, Qld. D young ♂, QM I30772, Moreton Bay, Qld. E, ♀, paratype, AMS IA4205, Port Curtis, Qld.



Figure 41. *Hippocampus procerus*. Collection sites of specimens examined.

anteriorly near base; neck ridge with low spines, one centrally and one at posterior end; superior trunk ridge with enlarged blunt spines on 1st, and from 7th ring on; lateral trunk ridge with spines on 2nd to 10th rings, progressively increasing in size; inferior trunk ridge with angular and downward directed spines on last few rings; ventral trunk ridge with few downward directed spines, those on last 2 rings enlarged; subdorsal spines 3/0,1,0; superior tail ridge spines well developed anteriorly, except on first ring, progressively diminishing in size posteriorly; inferior tail ridge continuous with inferior trunk ridge, with 6 spines progressively diminishing in size posteriorly; lateral line with pores detectable to about 19th tail ring. *Colour in life:* (based on colour transparency taken by B. Cowell of a

female specimen from Moreton Bay, 8 cm in height) trunk pale yellowish white ventrally, dusky brown with black scribbles and numerous tiny white spots dorsally above lateral trunk ridge, and continuing over tail; snout dusky with irregular thin white barring; brownish black shading ventrally on eye and snout; dorsal fin with a dusky longitudinal line at mid-level. *Colour in alcohol:* plain brown with fine dark scribbles or pale saddles.

Distribution (Fig. 41). Southern Queensland from Hervey Bay to Moreton Bay, with a single record from Gulf of Carpentaria which may be erroneous (Jeff Johnson, pers. comm.). Occurs on mixed algae reef to depths of about 20 m.

Remarks. This species is named *procerus*, from the Latin for “tall” in reference to the tall coronet. Previously confused with *Hippocampus tristis* and *H. whitei*, *H. procerus* is more similar to the latter, differing from it in having a taller and spinier coronet, higher fin-ray counts, and generally a spinier physiogamy.

Hippocampus elongatus

West Australian Seahorse

Fig. 42

Hippocampus elongatus Castelnau, 1873: 144. Fremantle, WA.
Hippocampus subelongatus Castelnau, 1873: 145. Fremantle, WA.
Hippocampus angustus (non Günther) Whitley & Allan, 1958: in part.
Hippocampus angustus (non Günther) Paxton *et al.*, 1989: in part.
Hippocampus subelongatus Lourie *et al.*, 1999.

Diagnosis. Dorsal-fin rays 18; pectoral-fin rays 17–18; trunk rings 11; tail rings 33–34; tall coronet, crown with 5 spines

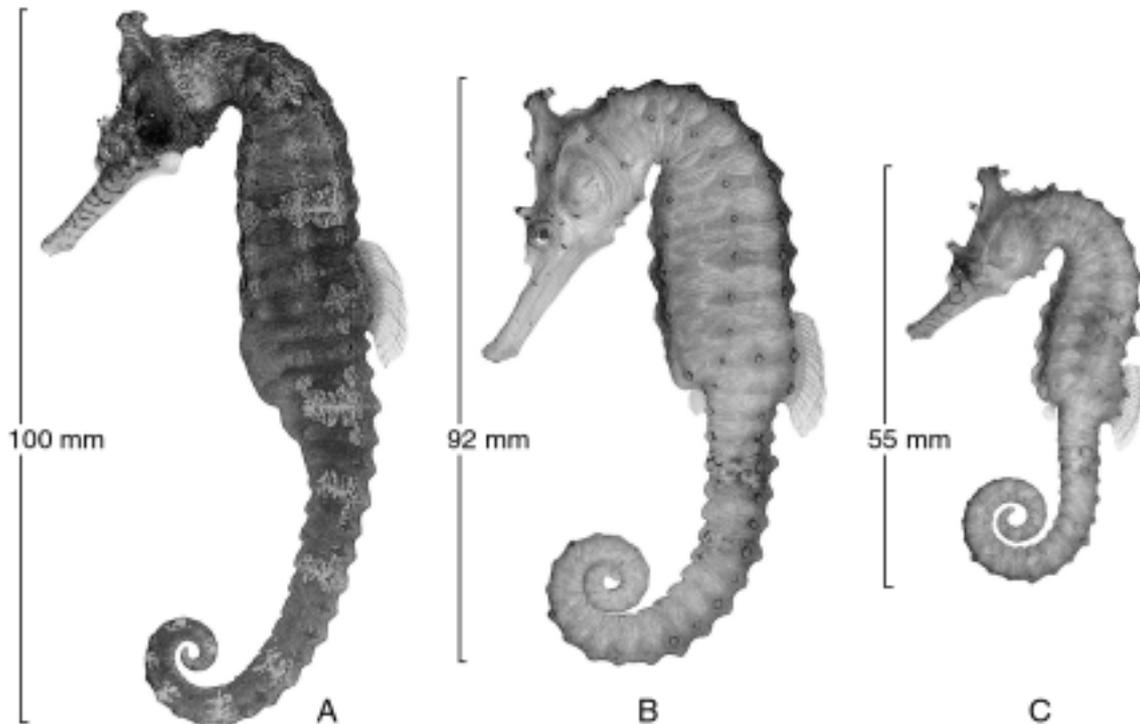


Figure 42. *Hippocampus elongatus*. A, ♂, AMS I20228-004, Woodman Point, Cockburn Sound, WA. B, ♀, AMS I20228-004, Woodman Point, Cockburn Sound, WA. C juvenile, AMS I20228-004, Woodman Point, Cockburn Sound, WA.

in star arrangement when young, spines becoming blunt and forming rounded flanges in large adults; spines on trunk and tail of moderate length in juveniles, becoming blunt with growth, appearing as low tubercles in adults; nose spine angular. *Fin rays*: dorsal 18; pectoral 17–18; anal 4. *Rings*: subdorsal 2 + 1; trunk 11; tail 33–34. *Spines or tubercles*: subdorsal 3/0,1,0–0.5. Spines of moderate length in juveniles, becoming blunt with growth and appearing as low tubercles in adults. Enlarged tubercles above eyes, laterally on head, and sub-dorsally on trunk. Nape spine long when young. Nose spine angular. Shoulder-ring with 3 blunt spines, uppermost just above top of pectoral-fin base, central spine at level of last few rays of pectoral-fin base and lowermost double, in form of short laterally-directed, diverging spines. *Coronet*: tall, crown of juvenile with 5 diverging spines in star arrangement, spines becoming blunt with growth forming rounded flanges in large adults. *Lateral line*: indistinct, pores extending to 22nd tail ring. *Colour in life*: highly variable from grey, yellow, brown to burgundy-red, usually with thin dark barring on snout; body plain or with dusky striations or reticulations. *Colour in alcohol*: pale brown, usually retains features of patterns in live individuals.

Measurements. Height of largest examined, female, 145 mm, but known to reach a height of about 20 cm. Head long, about 85–90% of trunk length and snout about 1/2 head length. Trunk slender in both sexes, depth 38–46% of its length.

Distribution (Fig. 43). Recorded between Cape Naturalist and Kalbarri in Western Australia, where it inhabits shallow algae and sponge reefs in sheltered bays.

Remarks. *Hippocampus elongatus* is a common species in the Perth region, occurring seasonally in the lower reaches of Swan River. It is replaced by more spiny species from Shark Bay northwards. Castelnau (1873) described *H. elongatus* and *H. subelongatus*, each on the basis of a single specimen sent from Fremantle, WA. Castelnau was not sure about the validity of *H. subelongatus* thinking that it might be the same as *H. elongatus*. Lourie *et al.*, 1999 chose to recognise the name *H. subelongatus* for this species, despite *H. elongatus* being the first name published



Figure 43. *Hippocampus elongatus*. Collection sites of specimens examined and localities of specimens photographed underwater.

and *subelongatus* being a derivative of *elongatus*, giving the presence of 3 “paratypes” of *H. subelongatus* and the absence of the type of *H. elongatus* in the collection of the Paris museum (Bertin & Estève, 1950) as the reason. As Castelnau had only a single type of *H. subelongatus*, it is likely that the second largest specimen regarded as a syntype by Bertin & Estève is the type of *H. elongatus* as suggested by the following evidence. Castelnau stated that the length of the *H. elongatus* type is “three inches [76 mm] in a straight line”. Although this may be interpreted as a total length measurement, it may just as easily be a “straight-line” measurement from the highest to the lowest parts of the dry specimen along its axis, regardless of the body or the tail shape. The total length of 76 mm is that of an extremely small specimen, but if the measurement is taken as a straight-line along the axis from the highest to the lowest parts of the specimen, it corresponds exactly with one of the “paratypes” of *H. subelongatus* (MNHN A4536). Castelnau’s description of *H. elongatus* not only agrees with this specimen but is consistent with other similar-sized specimens examined. The MNHN A4536 specimen is 76 mm in a straight line measurement and 140 mm in total length. Castelnau’s description of *H. subelongatus* agrees with the largest of the “paratypes” (MNHN A4535) which is 124 mm in a straight line measurement and 175 mm total length. The smallest “paratype” of *H. subelongatus* (MNHN A4552), 85 mm in a straight line measurement and 108 mm in total length, represents this species but disagrees with Castelnau’s descriptions. *Hippocampus elongatus* has page priority, and from Castelnau’s statement that *subelongatus* “may be a more developed age of *Elongatus*” it clearly would have been his choice. Therefore, *Hippocampus elongatus* is here reinstated as the senior synonym for this species.

Material examined. MNHN A4535, probable type of *H. subelongatus*, height 132 mm, photograph, Fremantle, WA. MNHN A4536, probable type of *H. elongatus*, height 100 mm, photograph, Fremantle, WA. MNHN A4552, height 93 mm, photograph, Fremantle, WA. AMS I20228-004 (3), ♂, height 135 mm; ♀, height 145 mm; juvenile, height 94 mm; all Woodman Point, Cockburn Sound, WA, 32°08’S 115°45’E, depth 3–8 m, B.C. Russell & R. Kuitert, 25 Mar 1978. AMS I26903-002, ♀, height 145 mm, Palm Beach Cockburn Sound, WA, 32°11’S 115°43’E, depth 4–12 m, collector not registered, 25 Jul 1971. AMS I20350-001, juvenile, height 96 mm, Sulphur Rock Cockburn Sound, WA, 32°11’S 115°43’E, depth 18 m, N. Coleman, 16 Jan 1972.

Hippocampus spinosissimus

Hedgehog Seahorse

Fig. 44

The following is my translation of Weber’s (1913) original description in German (my additions in italics and within parentheses):

Hippocampus spinosissimus n.sp. fig. 44. Station 49. Sapeh Strait. 70 m; sand and scallops. 2 specimens c. 70 mm.

Dorsal fin 17; pectoral fin 15. Trunk 11 and tail 34 rings. Head 1.5× trunk-length and 5.8× total length. The trunk 2 times tail length. The snout as long as the post-orbital part of the head, and twice as long as the eye-diameter, and the least depth equal to 3/4 of the

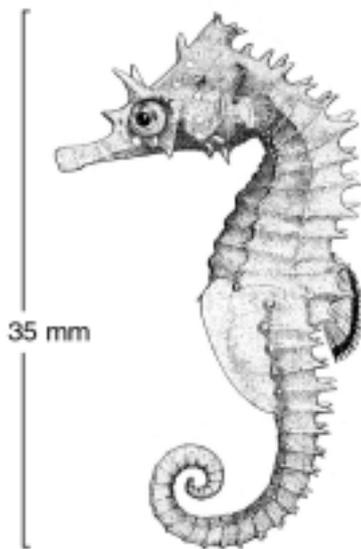


Figure 44. Weber's fig. 44 (in part) of *Hippocampus spinosissimus* from Sapeh Strait (♂).

eye-diameter. The brood-pouch is situated below the first 6 tail rings. The dorsal fin is positioned over the last 2 trunk rings and first 2 tail rings. The coronet is c. 1/2–2/3 as long as the snout; and considerably higher and thicker cylindrical with the 5 sharp diverging spines, of which the frontal 2 are not slanting backwards like those behind. At its base lies a vertical, moderate spine (*nape-spine*). Above the eyes, large sharp spines, equal in length to the eye diameter, directed upwards and out. In front between the eyes, a single forward directed spine (*nose-spine*). Two postorbital spines in series; two at the bases of the pectoral fins and 3 others along the ridge below the eye (1) and throat (2, *the double lower shoulder-ring spine*). The spines on the trunk and following half of the tail, sharp, enlarged and more protruding on the 1st, 4th, 7th, 11th, trunk rings, and the 4th, 7th and 11th tail rings. The colour in alcohol is plain yellow-brown with white spots on the head; a submarginal black stripe in the dorsal fin.

The measurements of the specimens: total length 70 mm, head 12 mm, trunk 18 mm, tail c. 40 mm, snout 5 mm, eye just under 2.5 mm.

This new species is closely related to *H. erinaceus* Günther (= *H. angustus* Günther) and who knows, perhaps even identical, but I cannot determine this from the Kürze von Günther diagnosis. In any case, the statement "Breast-spines double on each side" disagrees with my specimens, and it does not have 17 rays in the dorsal fin. In 1893 I made a similar conclusion during the work on fish for Semon's (Max Weber. *Fische von Ambon* etc., in *Semon's Zool. Forschungsreisen in Australien* etc., p. 275.). At that time I listed a specimen from Thursday I., Torres Strait, #193 as *Hippocampus (erinaceus* Gthr.?). This specimen agrees with the above described examples of *H. spinosissimus*, only the median ridge on the trunk is so deeply shaped with rounded edges, it obscures the diagnostic spines.

Remarks on the Max Weber description

A later description in English of *Hippocampus spinosissimus* in Weber & de Beaufort (1922) is short and was modified considerably from the original. The caption with Weber & de Beaufort's figure is incomplete and misleading. They assumed that the specimen from Thursday I. was conspecific with the types from Sapeh Strait. In the original description, a fish from Sapeh Strait was illustrated in fig. 44 (reproduced here as Fig. 44), but it was accompanied by a second illustration showing the facial part of the head based on the specimen from Thursday I. This is clear in the German caption, but not mentioned in the English version by Weber & de Beaufort. The Thursday I. specimen has similar spines on the head but as Weber stated, the specimen does not agree with the specimens from Sapeh Strait. The specimen from Thursday I. has cross bands on the snout which were mentioned in the English description, but no cross-bands on the snout are mentioned in the German description of *H. spinosissimus*. The specimen from Thursday I. appears to be *H. grandiceps*. Reports of *H. spinosissimus* from elsewhere are based on a variety of species with distinct spines. No Australian species match the description and illustration of *H. spinosissimus*, especially among those with 17 dorsal-fin rays and 15 pectoral-fin rays. Spines on the superior trunk ridges are long in males of *H. spinosissimus*, which, except for *H. multispinus*, are short in males of Australian species. Lourie *et al.* (1999) report *H. spinosissimus* from various regions in the western Pacific, including Australia. I have examined material from Indonesia and the Philippines that match the Lourie *et al.* (1999) description of *H. spinosissimus*, and conclude that these are not *H. spinosissimus*, but other species such as *H. moluccensis*. The types from Sapeh Strait are the only known specimens of *H. spinosissimus*, and its distribution appears to be limited to the Komodo region

Hippocampus multispinus n.sp.

Northern Spiny Seahorse

Fig. 45

Hippocampus angustus (non Günther) Paxton *et al.*, 1989: in part.
Hippocampus angustus (non Günther) Lourie *et al.*, 1999: in part.

Type material. HOLOTYPE: NTM S12955-009, ♀, height 105 mm, Arafura Sea, Northern Territory, 10°49'S 135°07'E, depth 54 m, H. Larson, 25 Oct 1990. PARATYPES: NTM S12611-012, ♀, height 140 mm, Arafura Sea, NT, 10°26'S 136°24'E, depth 56–57 m, W. Houston, 8 Mar 1985. NTM S13917-001, ♂, height 110 mm, Elizabeth River, Darwin Harbour, NT, 12°32.0'S 130°56.3'E, depth 12 m, R. Williams & H. Larson, 23 Nov 1991. NTM S13257-001, ♀, height 100 mm, Gulf of Carpentaria, NT, 13°03'S 136°45'.E, depth 22 m, R. Williams, 23 Nov 1991. NTM S13326-003, ♀, height 98 mm, west of Shepparton Shoal, Timor Sea, NT, 12°13'S 129°43'E, depth 46 m, NT Fisheries, 6 Dec 1990. NTM S13974-006, ♀, height 94 mm, N of Dampier Archipelago, NT, 20°13'S 116°18'E, L. Bullard, 11 May 1983. NTM S13541-001, juvenile, height 50 mm, Arafura Sea, NT, 10°28.9'S 134°11.1'E, depth 59–60 m, R. Williams, 26 Sep 1992. CSIRO B3594, NW of Dampier Archipelago, WA, 20°26.7–25.9'S 116°19.1–20.1'E, demersal trawl, FRV *Soela*, CSIRO, 15 Oct 1983.

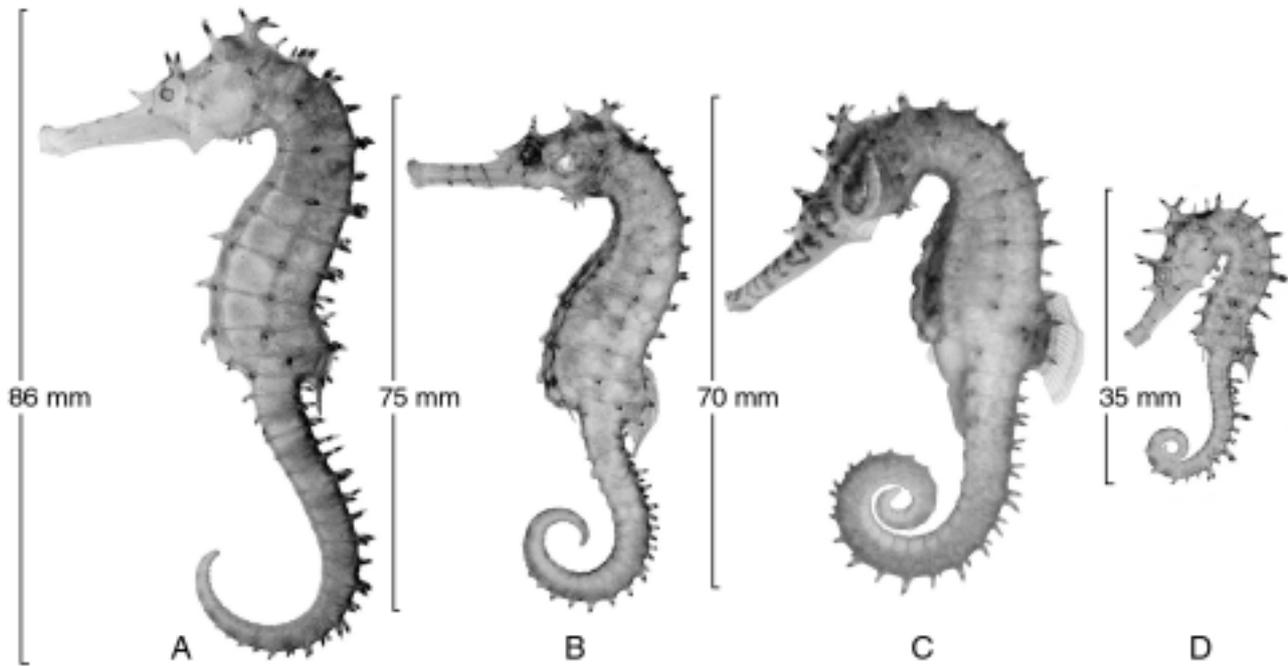


Figure 45. *Hippocampus multispinus*. A, ♀, holotype, NTM S12955-009, Arafura Sea, NT. B, ♀, paratype, NTM S13326-003, Arafura Sea, NT. C, ♂, paratype, NTM S13917-001, Darwin Harbour, NT. D, juvenile, paratype, NTM S13541-001, Arafura Sea, NT.

Diagnosis. Dorsal-fin rays 18; pectoral-fin rays 16–18 (usually 17); trunk rings 11; tail rings 30–35; spines long and sharp, spine above eye equal in length or longer than eye-diameter, perpendicular to snout; nose-spine sharp, angled forward 45° to snout, anterior spines on superior tail ridge longer than spaces between them.

Description. Head moderately long, 73% trunk length; snout long, just over half head length; dorsal fin with 18 rays, base over 2 trunk and 1 tail ring; pectoral-fin rays 17 (16–18, usually 17); trunk rings 11; tail rings 35 (30–35). Spines long and sharp; subdorsal spines 3/0,1,0; length of spine above eye equal to eye-diameter, perpendicular to snout; nose spine moderately long, angled forward 45° to snout; nape spine long, perpendicular to nape; long spine behind eye; double spines below eye; shoulder-ring with 3 long spines, uppermost just above level of pectoral-fin base, central spine at level of last few rays of pectoral-fin base, and lowermost double, in form of laterally directed, diverging spines; lateral head spine long; coronet with 5 long diverging spines; neck ridge with 2 spines, one centrally and one at posterior end; superior trunk ridge with long spines, slightly enlarged at regular intervals from 1st ring to below dorsal-fin base, length of some about equal to eye-diameter; lateral ridge with long spines but spines absent from rings 1, 3, 5 and 11; inferior trunk ridge with series of spines from 6th to 11th ring, ranging in length from short to long; ventral trunk ridge with spines on last 5 rings, angled posteriorly on last two; superior tail ring spines long, those anterior spines much longer than longitudinal distances between adjacent spines. Lateral line indistinct, comprising small pores each with a single papilla, intermittently detectable on tail to 20th ring. Height of largest specimens 140 mm. *Colour in life:* (based on a colour transparency of the paratype CSIRO B3594 from off the Dampier Archipelago) evenly dark brown from rear of head

to end of tail; head white with few brown spots radiating from eye; whitish bands on trunk rings 1, 4, 6, 8 and 11; spines mostly white around bases, the tips black. Helen Larson sent an aquarium photograph of a live female from Darwin Harbour that is an orange-gold colour with few small white spots scattered over the head and faint dark bars on the snout. *Colour in alcohol:* pale brown without markings, sometimes with few faint dusky bars on snout.

Distribution (Fig. 46). Apparently widespread in northern waters from the Dampier Archipelago to southern Papua New Guinea. A photograph of this species was taken by Bob Halstead in Milne Bay, PNG, clinging to soft coral in a strong current-prone habitat at a depth of 25 m. Most specimens trawled at depths between 20 and 60 m, although one paratype came from 12 m in Darwin Harbour.

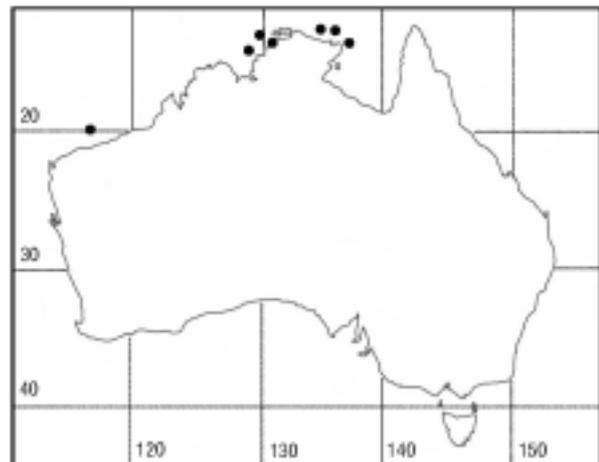


Figure 46. *Hippocampus multispinus*. Collection sites of specimens examined.

Remarks. This species is named *multispinus* from the Latin *multus* (numerous) and *spinus* (thorny or spiny), in reference to the numerous spines over the head and body. *Hippocampus multispinus* has been confused with other species with prominent spines, including *H. histrix* and *H. spinosissimus*. *Hippocampus multispinus* is readily distinguished from *H. histrix* in having the long double lower shoulder-ring spines, that diverge from one another in a V-shape, rather than the single long spine of *H. histrix*, and from *H. spinosissimus* in having a long snout that is longer than half the head length, in contrast to well short of half the head length in *H. spinosissimus*. *Hippocampus multispinus* is similar in morphology to *H. hendriki*, but the latter has shorter spines in adults, lacks most spines on the superior trunk ridges in males, and has saddle-like markings which are missing in *H. multispinus*.

Hippocampus histrix

Thorny Seahorse

Fig. 47

Hippocampus histrix Kaup, 1856. Japan.

Diagnosis. Dorsal fin rays 17–19; pectoral-fin rays 17–18; tail rings 33–34; spines long and sharp; nape spine long, directed upward, placed close to coronet; lower shoulder-ring spine single, long, directed laterally and slightly forward. *Fin rays:* (after Nakabo, 1993) dorsal 17–19; pectoral 17–18; anal 4. *Rings:* subdorsal 2 + 1; trunk 11; tail 33–34. *Spines or tubercles:* subdorsal 3/0,1,0. Spines long and sharp; length of spine above eye about equal to eye-diameter; nose spine slightly shorter and nape spine slightly longer than eye spine; 2 sharp neck spines, similar to coronet spines in length; trunk ridge spines on nearly all trunk and tail junctions, only absent on 1st ring of lateral ridge, starting on 4th inferior trunk ridge, and a single subdorsal spine on tail ridge. *Coronet:* of moderate height, but usually enlarged with 5 long diverging spines on apex. Nape spine immediately preceding and often reaching as coronet. *Lateral line:* not detectable from photographs. *Colour in life:* highly variable from grey, greenish, yellow, or brown to burgundy-red; usually one with or several thin white bars on snout; body plain or with pale saddle-like markings; tips of spines often black. *Colour in alcohol:* Not examined.

Measurements. Height of largest specimen reported 15 cm.

Distribution. Ranging from Japan to Bali, Indonesia, along Wallace’s Line, and to New Caledonia in the Coral Sea (based on photographs taken by the author and others). Occurs on deep coastal slopes, primarily in depths over 15 m on soft bottom, in areas exposed to strong tidal currents. Usually found clinging to soft corals, sponges or occasionally with *Halimeda* algae.

Remarks. There are no specimens of *Hippocampus histrix* in Australian collections and no photographs of specimens taken in Australian waters were found. The extensive geographical range suggests that young of this species may be pelagic. *Hippocampus histrix* is included here because of previous (incorrect) reports of Australian occurrence, and the likelihood that the species will be found in Australia.



Figure 47. *Hippocampus histrix*. Osezaki, Izu Peninsula, Japan. Photograph taken by Hiroyuki Uchiyama.

***Hippocampus hendriki* n.sp.**

Eastern Spiny Seahorse

Fig. 48

Hippocampus angustus (non Günther) Paxton *et al.*, 1989: in part. *Hippocampus* sp. 1 Kuiter, 2000, p. 34.

Type material. HOLOTYPE: AMS I20923-002, ♂, height 100 mm, Cape York, 10°39'S 142°30'E, prawn trawl, depth 16–18 m, AIMS AMS QM, 15 Feb 1979. PARATYPES: QM I15837, ♂, height 95 mm, west of Adolphus Passage, N Qld, 10°38'S 142°28'E, trawled 9–10 fm, AIMS AM QM, 15 Feb 1979. QM I11772 (2), ♀ & ♂, heights 104 & 96 mm, off Cairns, Qld. CSIRO H3639-03, E Newcastle Bay, Qld, 10°52.8'S 142°58.6'E, Florida Flyer prawn net, depth 20 m, G. Yearsly & P. Graham (CSIRO), FRV *Surveyor*, 26 Nov 1993. AMS IA6752, juvenile, height 47 mm, off Lindeman I., Qld, 20°27'S 149°02'E, trawled, G.P. Whitley, 27 Jul 1935.

Other material examined: NTM S13273-019, juvenile, Gulf of Carpentaria, Qld.

Diagnosis. Dorsal-fin rays 17–18; pectoral-fin rays 16–17; trunk rings 11; tail rings 34; subdorsal spines 3/0,1,0; nose spine of moderate length, angular in shape; spine above eye long, but shorter than eye-diameter; spine behind eye of moderate size, followed by longer lateral head spine; coronet moderately high, sloping back in line with head profile; superior trunk ridge spines reduced to tubercles before dorsal fin in males, or entire ridge having irregular rugose parts with small spines on and in between junctions with rings.

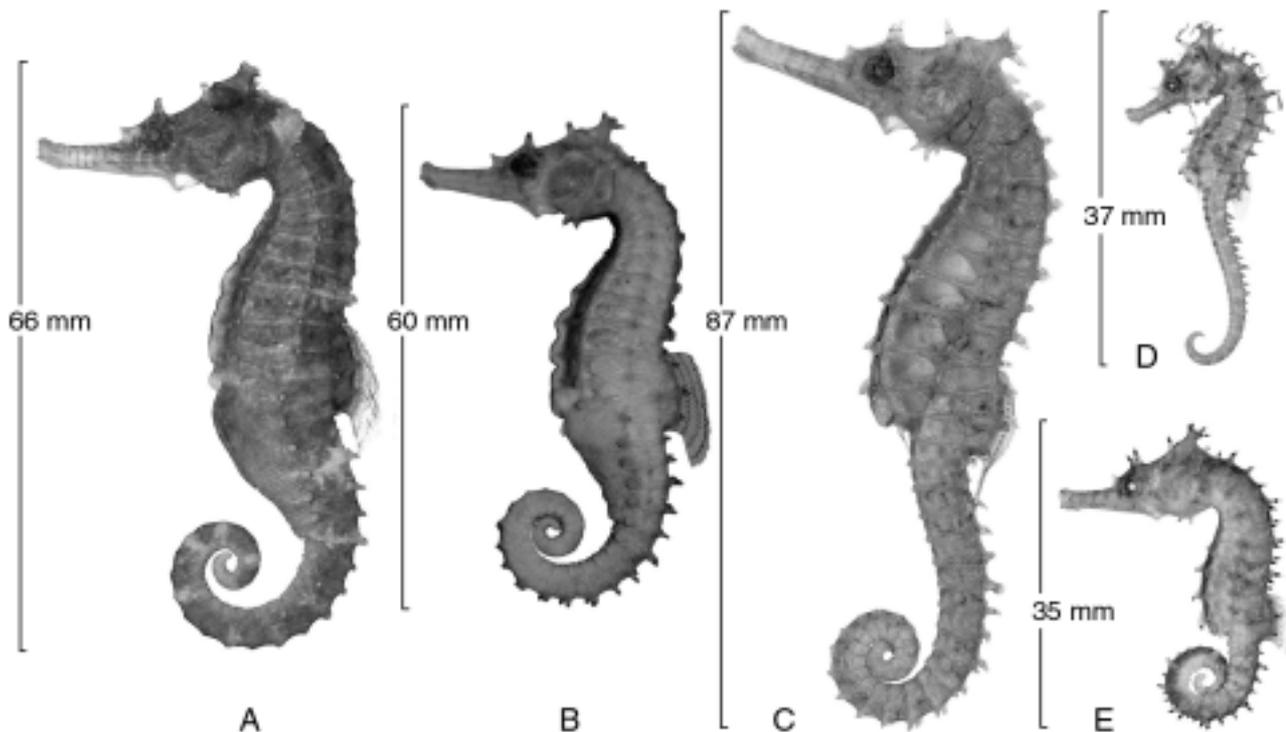


Figure 48. *Hippocampus hendriki*. A, ♂, holotype, AMS I20923-002, Cape York, Qld. B, ♂, paratype, QM I15837, Cape York, Qld. C, ♀, paratype, QM I11772, off Cairns, Qld. D, juvenile, paratype, AMS IA6752, Lindeman I., Qld. E juvenile, NTM S13273-019, Gulf of Carpentaria, Qld.

Description. Head large, length 85% of trunk length; snout moderately long, about equal to postorbital length; dorsal fin with 18 rays (17 in one of four paratypes), base over 2 trunk and 1 tail ring; pectoral-fin rays 16 on one side and 17 on other side (16–17 in paratypes); trunk rings 11; tail rings 34; moderately long spine above eyes, length about 70% of eye diameter; spine of similar size behind eye; slightly larger lateral head spine, directed laterally; nape spine of moderate length perpendicular to nape; 2 separate angular spines below eye; 3 spines of moderate length to long on shoulder ring, uppermost just above pectoral-fin base, central spine at lower level of pectoral-fin base, and lowermost as a double spine ventrally, with one portion directed forward and other directed laterally; coronet raised and angled back matching angle of head profile, with 5-spined, star-like crown, and double spine posteriorly below crown on side; neck ridge even with rugose edge (with 2 spines in small paratypes); superior trunk ridge with blunt tubercles to 8th ring, followed by spines of moderate length to end of dorsal fin base; lateral trunk ridge with spines on 2nd, 4th, and 6–10th rings; inferior trunk ridge with spines to 10th ring, followed by tubercles on remaining rings; ventral trunk with ridge of skin (with spiny in juvenile and female paratypes); subdorsal spines 3/0,1,0; superior tail ridge with enlarged spines on 2nd and 4th to 10th rings, becoming progressively shorter posteriorly, followed by smaller tubercles that similarly become progressively smaller; inferior tail ridge with tubercles that are continuous with those on trunk ridge to 9th ring, becoming progressively smaller posteriorly; lateral line with pores detectable to about 20th tail ring. Height of largest specimen 104 mm. *Colour in life:* (based on photographed of female, CSIRO H3639-03) pale yellow on snout, lower part of head and front of trunk, darkening to pale orange on top and back

with dark saddle-like markings over back at 1st, 4th, and 8th trunk rings, small saddle below dorsal fin, and others on tail on about 4th and 7th rings; top of snout with about 10 thin dusky bars; dark blotch on head below gill-opening; eye with brown vertical bar, extending to spine above it; tips of spines black; dorsal fin with thin longitudinal lines. *Colour in alcohol:* pale to dark brown, sometimes with pale saddle-like markings at first and eight trunk rings, as well as on tail, becoming bands posteriorly; snout with thin dark barring.

Distribution (Fig. 49). Apparently restricted to inner Great Barrier Reef area, from the Capricorn region to Cape York, Queensland. Habitat unknown. All specimens trawled on flat substrate at depths of 18 to 25 m.



Figure 49. *Hippocampus hendriki*. Collection sites of specimens examined.

Remarks. This species is named *hendriki* for Hendrik Kuitert in recognition of his keen interest in seahorses that he successfully conveyed to classmates and teachers. *Hippocampus hendriki* has been confused with other species with prominent spines, including *H. angustus*, *H. multispinus*, and *H. grandiceps*. *Hippocampus angustus* has lateral-ridge spines on the 3rd and 5th rings that are absent in *H. hendriki* as well as *H. multispinus*. *Hippocampus hendriki* is distinguished from *H. multispinus* in having shorter spines above the eyes, the length obviously shorter than eye-diameter, rather than longer than the eye-diameter. *Hippocampus grandiceps* has a longer head, which is 94% to over 100% (versus 85% or less) of trunk-length, and holds its head close to the trunk, whilst the head of *H. hendriki* is held at about 90° to the trunk. Males can look superficially similar to *H. queenslandicus* which has different fin counts and a tail with less spine development, but *H. hendriki* is readily distinguished from that species by its nose spine and the barring on its snout. Males of *H. hendriki* have long spines on ridges near the pouch region, but lack them on the superior trunk ridge anteriorly. Small juveniles have proportionally longer spines and disproportionately enlarged spines featuring dermal flaps near their tips. In all specimens examined, the head is maintained at right angle to the body, which may be an adaptation to living on open substrates. This is consistent with my observations of other syngnathids, including seahorses and pipefishes, that live out in the open and usually position themselves almost horizontally on the bottom to feed, keeping their head forward. This contrasts with species that cling to weed and maintain the body almost vertically while feeding, keeping their head close to their chest.

Hippocampus angustus

Western Spiny Seahorse

Fig. 50

Hippocampus angustus Günther, 1870: 200. Shark Bay, Western Australia.

Hippocampus erinaceus Günther, 1870: 206. No locality.

Diagnosis. Dorsal-fin rays 18–19; pectoral-fin rays 15–20 (usually 17, rarely 15, 19 or 20); trunk rings 11; tail rings 31–32; trunk slender, its depth equal to or less than snout length; length of spine above eye about pupil diameter; double lower shoulder-ring spines; coronet with 5 sharp spines diverging from apex; snout with thin dusky bars; dorsal with a thin dusky line at margin. *Fin rays:* dorsal 18–19; pectoral 15–20 (usually 17, rarely 15, 19 or 20); anal 4. *Rings:* subdorsal 2 + 1; trunk 11; tail 31–32. *Spines or tubercles:* Subdorsal 3/0,1,0; length of spine above eye equal to pupil diameter, perpendicular to snout; nose spine small, directed forward; nape spine small, directed slightly forward; small spine behind eye; double spines below eye; 3 shoulder ring spines, upper two at either end of pectoral-fin base, lowermost double, in form of laterally directed, diverging spines, anterior one often small; lateral head spine of moderate size to long; superior trunk ridge with tubercles of moderate size in males and short but sharp spines in females; lateral trunk ridge with spines of moderate size on 2nd to 10th rings; inferior trunk ridge with thick downward directed tubercles in males and spines of moderate length in females; ventral trunk ridge expanded forward as scalloped ridge in males, but bearing downward directed

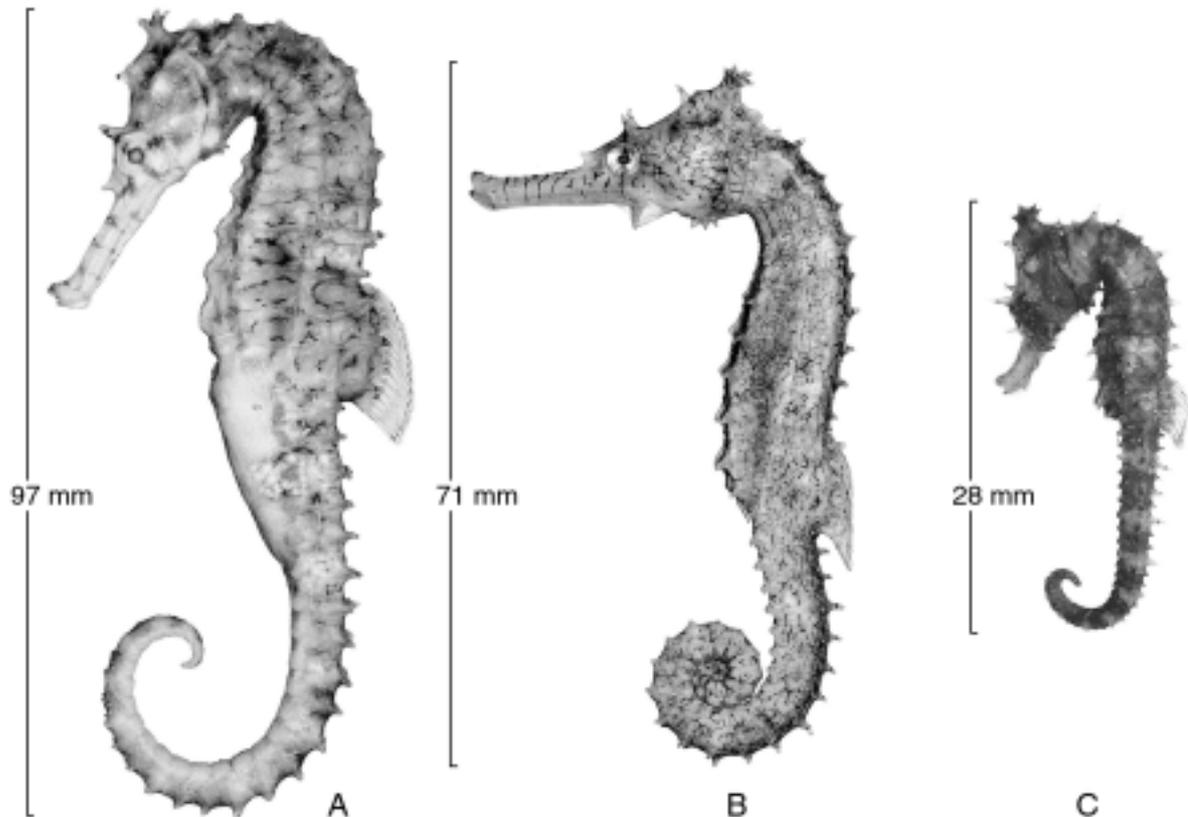


Figure 50. *Hippocampus angustus*. A, ♂, WAM P27351-001, Shark Bay, WA. B, ♀, WAM P8174, Shark Bay, WA. C, juvenile, WAM P29077-001, Shark Bay, WA.

angular spines in females; superior tail ridge with spines of moderate length, though usually none on 1st ring; inferior trunk ridge with tubercles of moderate size or small spines, spines usually enlarged along pouch in males. *Lateral line*: small pores, more or less distinct, extending to 20th tail ring, pores difficult to detect posteriorly. *Coronet*: moderately high with 5 diverging sharp spines on apex. *Colour in life*: grey to brown, often covered with fine dark scribbles; snout with 5–6 vertical dark bands; dorsal fin with thin dusky marginal line. *Colour in alcohol*: Pale brown with thin dusky bars on snout and scribble markings on head and body.

Measurements. Height of largest specimens examined 149 mm. Head length about 80% in trunk length and snout of adults long, nearly half head length (45.8–48.2%), but short in juveniles (37.8% in 36 mm specimen). Trunk slender, its depth usually about equal to or less than snout length in all stages.

Distribution (Fig. 51). Apparently restricted to Western Australia, from Shark Bay to the Dampier Archipelago, where it overlaps geographically with *H. multispinus*.

Remarks. This is one of several similar species with prominent spines living in the tropics that can be difficult to distinguish from one and another. It has been confused with *Hippocampus histrix*, *H. spinosissimus* and *H. multispinus*. It is readily distinguished from *H. histrix* in having a double lowermost spine on the shoulder-ring rather than a single. In addition, *H. histrix* has much longer spines on the head. *Hippocampus angustus* differs from *H. spinosissimus* in having a much longer snout, which is nearly half the head-length in adults, in contrast to much less than half the head-length. It can be distinguished from *H. multispinus* by its shorter spines, the length of the spine above the eye about the diameter of the pupil rather than the diameter of the eye. *Hippocampus angustus* was confused with several other species, including *H. elongatus* (incorrect synonym), *H. grandiceps*, *H. hendriki*, and *H. queenslandicus*, for which no names were available until now. The name was applied loosely to species with moderately long spines, while *H. histrix* was used for species with very long spines, such as *H. multispinus* and the juveniles of species that have relatively longer spines than adults. The inclusion of *Hippocampus erinaceus* as a



Figure 51. *Hippocampus angustus*. Collection sites of specimens examined.

synonym of *H. angustus* is uncertain. The type locality is unknown and the specimen appears to be a juvenile *H. angustus*. Suggestions that the type locality is “possibly NE Australia” may have come from Weber’s use of the name *Hippocampus (erinaceus)* Gthr.?) when listing a specimen that originated from Thursday I., Torres Strait, Australia. It seems that the specimen of *H. erinaceus* originated from Shark Bay, since Günther’s material described in the 1870s from Australia apparently came from NSW and the Perth region of WA. Lourie *et al.* (1999) commented that “The name *angustus* is here used in preference to *erinaceus* because of its known type locality”. If these names refer to the same species, *Hippocampus angustus* is also preferred as the senior synonym, based on page priority.

Material examined. WAM P5871 (2), ♂♂, heights 132–138 mm, Shark Bay, WA, Poole Bros, Jul 1963. WAM P6067, ♂, height 149 mm, Shark Bay, WA, Poole Bros, 5 Jun 1961. WAM P8174, ♀, height 106 mm, Shark Bay, WA, Poole Bros, *Bluefin*, May 1964. WAM P14580, ♀, height 96 mm, Shark Bay, WA, trawl, R. McKay, 3 Mar 1962. WAM P14590, ♂, height 76 mm, Shark Bay, WA, trawl, B.R. Wilson, 5 Jun 1980. WAM P14738, ♂, height 135 mm, east of Delambre I., Dampier Archipelago, WA, Poole Bros, September 1963. WAM P26053-001, height 140 mm, about 15 mi WSW Carnarvon, WA, c. 14 fm, L. Marsh & M. Sinclair, 2–3 Jul 1975. WAM P27351-001, ♂, height 134 mm, N Monte Bello I., WA, 20°05'S 115°45'E, Taiwanese Pair Trawl, J. Marek, 8 Nov 1981. WAM P27677-001, ♀, height 96 mm, about 15 mi WSW Carnarvon, WA, depth 24–31 m, L. Marsh & M. Sinclair, 2–3 Jul 1975. WAM P29077-001, juvenile, height 36 mm, Denham, WA, 25°32'S 113°32'E, depth 1–5 m, L.R. Lenanton, 31 Jul 1965.

Hippocampus grandiceps n.sp.

Big-head Seahorse

Fig. 52

Type material. HOLOTYPE: NTM S13273-019, ♂, height 76 mm, W Booby Island, Gulf of Carpentaria, Queensland, 10°44'S 141°53'E, depth 10 m, R. Williams, 29 Nov 1991. PARATYPES: NTM S13274-007 (3), ♂, height 75 mm; 2♀♀, heights 62 & 69 mm; both N Booby I., Gulf of Carpentaria, Qld, 10°26'S 141°45'E, depth 10.4 m, R. Williams, 29 Nov 1991. QM I30583, ♂, height 99 mm, Gulf of Carpentaria, Qld, 11°29'S 141°38'E, dredge, depth 18 m, J. Johnson & S. Cook, 3 Dec 1990. QM I12287, ♀, height 96 mm, Gulf of Carpentaria, Qld, 16°40'30"S 140°58'30"E, trawl, depth 6 fm, CSIRO *Rama*, 6 Oct 1963. QM I26319, ♀, height 105 mm, Gulf of Carpentaria, Qld Fisheries, Jul 1983. AMS I15557-075 (3), ♀♀, heights 95–105 mm, Gulf of Carpentaria, Qld, 17°24'S 140°09'E, prawn trawl, depth 10 m, CSIRO, 27 Nov 1963.

Diagnosis. Dorsal-fin rays 18; pectoral-fin rays 17–18 (usually 18); trunk rings 11; tail rings 32–33; head long, 94–103% of trunk length; head angled down to near trunk.

Description. Head long, 94% of trunk length (over 100% in paratypes); snout long, just under half head length (42–48%); dorsal fin with 18 rays (17–18), base over 2 trunk and 1 tail ring; pectoral-fin rays 18; trunk rings 11; tail rings 33 (32–33); subdorsal spines 3/0,1,0; spine above eye as long as pupil diameter, perpendicular to snout; nose spine angular, directed forward 45° to snout; length of nape spine equal to pupil diameter, directed somewhat forward; spine

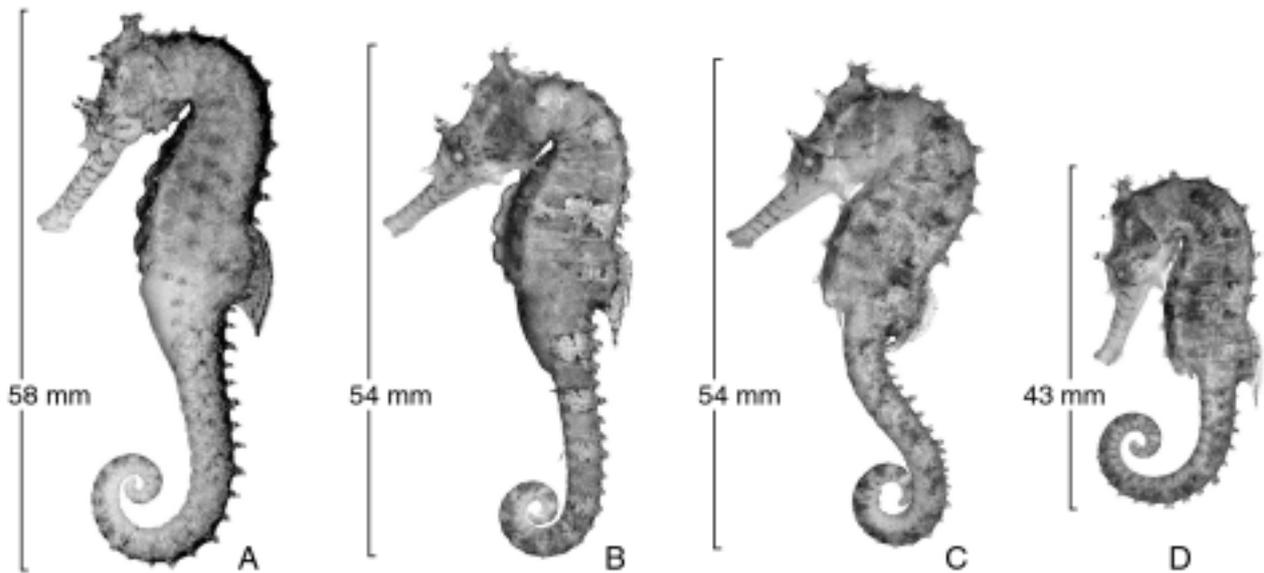


Figure 52. *Hippocampus grandiceps*. A, ♂, holotype, NTM S13273-019, Gulf of Carpentaria, Qld. B, ♂ paratype, NTM S13274-007, Gulf of Carpentaria, Qld. C & D, ♀♀, paratypes, NTM S13274-007, Gulf of Carpentaria, Qld.

of moderate length behind eye; double spines below eye; shoulder-ring spines long, uppermost and central spines at levels with either ends of pectoral-fin base, lowermost double, anterior barb smaller and directed forward; lateral head spine moderately long; coronet of moderate height with 5 short and sharp diverging spines at apex; neck ridge with 2 short spines, one centrally and one at posterior end; superior trunk ridge with short spines, slightly enlarged at regular intervals from 1st ring to below dorsal fin base; lateral ridge with spines on 2nd to 10th ring, those on rings 2, 4, and 6–10 enlarged; inferior trunk ridge with series of spines from 4th to 11th ring, progressively from short to long; ventral trunk ridge with downward angled spines in females and scalloped edge in males; superior tail ring spines moderately long from 2nd to 14th ring, becoming progressively smaller posteriorly. Lateral line with small indistinct pores, increasingly becoming more difficult to detect posteriorly, reaching 21st tail ring. Height of largest specimen examined (female) 105 mm. *Colour in life*: unknown. *Colour in alcohol*: pale brown-grey with pale saddle-like areas on trunk and tail. Snout with distinct dusky barring along entire length.

Distribution (Fig. 53). Appears to be restricted to the Queensland side of the Gulf of Carpentaria. All specimens trawled or dredged in relatively shallow depths, usually during prawn surveys.

Remarks. This species is named *grandiceps* from the Latin words for large and head in reference to the head in this species that is proportionally larger than most others in the genus. *Hippocampus grandiceps* is very similar to *H. multispinus* but has shorter spines and its males lack long spines over the superior trunk ridge anterior to the dorsal fin, while males of *H. multispinus* have long spines in this position. Where *H. grandiceps* has spines on the 3rd and 5th rings at the lateral-ridge, they are absent in *H. multispinus*. While the head in specimens of *H. grandiceps* is held close to the trunk, it is perpendicular to the axis of

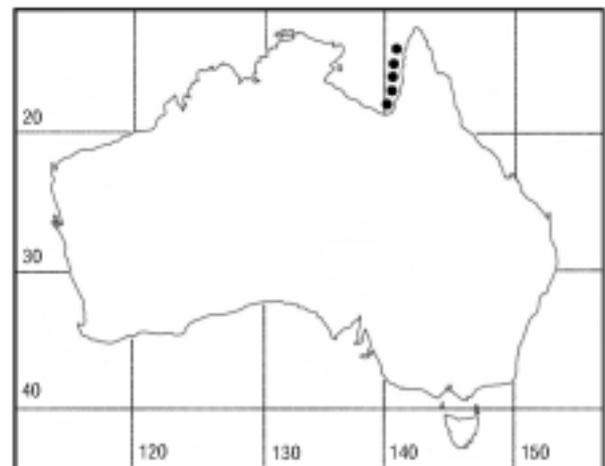


Figure 53. *Hippocampus grandiceps*. Collection sites of specimens examined.

the body in specimens of *H. multispinus*. The maximum size of *H. grandiceps* is considerably less than that of *H. multispinus* and other similar species. Although, *H. spinosissimus* also has prominent spines and attains a smaller maximum size, it has fewer rays in both the dorsal and pectoral fins. *Hippocampus hendriki* is also similar to *H. grandiceps*, but is closer to *H. multispinus*, sharing with it the absence of spines on the lateral-ridge of the 3rd and 5th trunk ring, and a head which is perpendicular to the body. The limited geographical range of *H. grandiceps* may reflect its preference for a unique habitat, the head-angle, body patterns, and shallower depth range suggest that it may inhabit more weedy areas than those populated by most other species with prominent spines (see remarks, *H. hendriki*).

ACKNOWLEDGMENTS. M. McGrouther and J. Pogonoski, AMS, J. Johnson, QM, B. Hutchins, WAM, T. Simms, SAMA, T. Bardsley, NMV, and H. Larson, NTM, and A. Graham, CSIRO, facilitated the loan of specimens. M. Horne, James Cook University, provided specimens of *H. queenslandicus* and *H. dahlia*. K. Graham, NSW Fisheries, provided information and photographs on NSW specimens of *H. tristis*. S. Lourie, Project Seahorse, provided photographs of the types of *H. tristis* and *H. planifrons*. R. Steene and T. Wu provided photographs of *H. bargibanti*. A. Ogawa provided the photograph of *H. kamyotrachelos*. H. Uchiyama provided the photograph of *H. histrix*. Maurice Pruvost, MNHN, provided photographs of the types of *H. elongatus* and *H. subelongatus*. Martin Gomon, Museum Victoria, advised on taxonomy and various aspects of this work. I appreciate the time taken by Helen Larson, Martin Gomon and John Paxton to read and comment on the manuscript, improving it in many ways.

References

- Allen, G.R., 1998. A new species of cardinalfish (Apogonidae) from the Komodo Islands, Indonesia. *Revue française Aquariologie* 25: 1–2.
- Allen, G.R., D.F. Hoese, J.R. Paxton, J.E. Randall, B.C. Russell, W.A. Starck II, F.H. Talbot & G.P. Whitley, 1976. Annotated checklist of the fishes of Lord Howe Island. *Records of the Australian Museum* 30: 365–454.
- Allen, G.R., & R.C. Steene, 1987. *Reef Fishes of the Indian Ocean*. Plate 18-6. Neptune City, New Jersey: T.F.H. Publication.
- Bertin, L., & R. Estève, 1950. Catalogue des types de poissons du Muséum national d'Histoire naturelle. 6e partie. Imp. Nationale, Cat. Fish Types, Paris 6e partie: 1–85.
- Bleeker, P., 1852a. Bijdrage tot de kennis der ichthyologische fauna van Singapore (*Mémoire sur la faune ichthyologique de Singapore*). *Natuurkundig Tijdschrift voor Nederlandsch Indië* 3: 82–83.
- Bleeker, P., 1852b. Bijdrage tot de kennis der ichthyologische fauna van de Moluksche eilanden Visschen van Amboina en Ceram. *Mémoire sur la faune ichthyologique des Moluques Poissons d'Amboine et de Céram* 3: 305–307.
- Bleeker, P., 1854a. Vijfde bijdrage tot de kennis der ichthyologische fauna van Amboina. *Cinquième mémoire sur la faune ichthyologique d'Amboine* 3: 505–506.
- Bleeker, P., 1854b. Overzicht der ichthyologische fauna van Sumatra, met beschrijving van eenige nieuwe soorten. *Areçu de la faune ichthyologique de Sumatra* 7: 107–108.
- Bleeker, P., 1855. Over eenige visschen van Van Diemensland. *Verhandelingen van het Koninklijke Akademie van Wetenschappen te Amsterdam* 2: 17, 28–31.
- Bleeker, P., 1983. *Atlas Ichthyologique des Indes Orientales Néerlandaises*. Plates for volumes XI–XIV, pl. 449. Washington: Smithsonian Institution.
- Castelnau, F.L. de, 1872. Contribution to the ichthyology of Australia. The Melbourne fish market. *Proceedings of the Zoological Acclimatisation Society of Victoria* 1: 196–197.
- Castelnau, F.L. de, 1873. Contribution to the ichthyology of Australia. 8. Fishes of Western Australia. *Proceedings of the Zoological Acclimatisation Society of Victoria* 2: 144–145.
- Castelnau, F.L. de, 1875. *Researches on the Fishes of Australia*. Intercolonial Exhibition Essays, Commissioners Melbourne International Exhibition, Melbourne 2: 3–52.
- Dawson, C.E., 1985. Indo-Pacific Pipefishes (Red Sea to Americas). Ocean Springs (Mississippi): The Gulf Coast Research Laboratory.
- Eschmeyer, W.N., 1998. *Catalog of Fishes*. Volumes 1–3. San Francisco: California Academy of Sciences.
- Fowler, H.W., 1907. A collection of fishes from Victoria, Australia. *Proceedings of the Academy of Natural Sciences of Philadelphia* 59: 419–444.
- Ginsburg, I., 1937. Review of the seahorse (*Hippocampus*) found on the coasts of the American continents and of Europe. *Proceedings of the United States National Museum* 83: 497–594.
- Gloerfelt-Tarp, T., & P.J. Kailola, 1984. *Trawled Fishes of Southern Indonesia and Northwestern Australia*. Australian Development Assistance Bureau; Directorate General of Fisheries, Indonesia; German Agency for Technical Cooperation.
- Gomon, M.F., 1997. A remarkable new pygmy seahorse (Syngnathidae: *Hippocampus*) from south-eastern Australia, with redescription of *H. bargibanti* Whitley from New Caledonia. *Memoirs of the Museum of Victoria* 56(1): 245–253.
- Grant, E.M., 1987. *Fishes of Australia*. Brisbane: E.M. Grant Pty. Ltd.
- Günther, A., 1870. *Catalogue of the Fishes in the British Museum*. Vol. 8, pp. 198–206. London: British Museum.
- Horne, M.L., 2001. A new seahorse species (Syngnathidae: *Hippocampus*) from the Great Barrier Reef. *Records of the Australian Museum* 53(2): 243–246.
- Johnson, J.W., 1999. Annotated checklist of the fishes of Moreton Bay, Queensland, Australia. *Memoirs of the Queensland Museum* 43(2): 709–762.
- Kaup, J.J., 1856. *Catalogue of the Lophobranchiate Fish in the Collection of the British Museum*. Pp. 76. London: British Museum.
- Kawanabe, H., & N. Mizuno, 1989. *Freshwater Fishes of Japan*. Tokyo: Yama-Kei Publishers.
- Kuitert, R.H., 2000. *Seahorses, Pipefishes & Their Relatives*. England: TMC publications.
- Lesson, R.P., 1827. Espèce nouvelle d'Hippocampe. *Bulletin Sciences National (Férussac)* II: 127–128.
- Lourie, S.A., A.C.J. Vincent & H.J. Hall, 1999. *Seahorses. An Identification Guide to the World's Species and Their Conservation*. London: Project Seahorse.
- McCulloch, A.R., 1911. Report on fishes obtained by the F.I.S. Endeavour on the coasts of New South Wales, Victoria, South Australia and Tasmania. Part 1. *Zool. Res. Endeavour* 1(1): 1–78.
- Nakabo, T., 1993. *Fishes of Japan with Pictorial Keys to the Species*. Tokyo: Tokai University Press.
- Ogilby, J.D., 1889. Notes on some fishes new to the Australian fauna. *Proceedings Zoological Society London* 1889 (pt. 2): 151–158.
- Ogilby, J.D., 1908. New or little known fishes in the Queensland Museum. *Annals of the Queensland Museum* 9: 3–41.
- Paxton J.R., D.F. Hoese, G.R. Allen & J.E. Hanley, 1989. *Zoological Catalogue of Australia 7 Pisces Petromyzontidae to Carangidae*, pp. 420–422. Canberra: Australian Government Publishing Service.
- Peters, W.C., 1869. Über neue oder weniger bekannte Fische des Berliner Zoologischen Museums. *Monatsberichte der Königlichen Preussischen Akademie Wissenschaften zu Berlin* 1869: 703–711.
- Peters, W.C., 1877. Reise S.S.S. “Gazelle”: überstandene Fische. *Monatsberichte der Königlichen Preussischen Akademie Wissenschaften zu Berlin* 1876: 831–854.
- Rafinesque, 1810. *Carratteri di alcuni nuovi generi e nuove specie di animali e piante della Sicilia*, 18.
- Randall, J.E., G.R. Allen & R.C. Steene, 1990, 1997. *Fishes of the Great Barrier Reef and Coral Sea*, 1st and 2nd editions. Crawford House Press.
- Steindachner, F., 1866. Zur Fischfauna von Port Jackson von Australien. *Sitzungsberichte Akademie Wissenschaften, Wien* 53: 424–480.
- Weber, M., 1913. *Die Fische der Siboga-Expedition*. Siboga Expedition Reportage 57. Leiden: E.J. Brill.
- Weber, M., & L.F. de Beaufort, 1922. *The Fishes of the Indo-Australian Archipelago*. Volume 4. Leiden: E.J. Brill.
- White, J., (1790). Journal of a voyage to New South Wales with sixty-five plates of non-descript animals, birds, lizards, serpents, curious cones of trees and other natural productions. London: Debrett.
- Whitley, G.P., 1931. New names for Australian fishes. *Australian Zoologist* 6: 310–334.

- Whitley, G.P., 1940. Illustrations of some Australian fishes. *Australian Zoologist* 9: 397–428.
- Whitley, G.P., 1952. Some noteworthy fishes from Eastern Australia. *Proceedings of the Royal Society of New South Wales* 1950–1951: 27–32.
- Whitley, G.P., 1964. Fishes from the Coral Sea and the Swain Reefs. *Records of the Australian Museum* 26(5): 145–195.
- Whitley, G.P., 1970. Abstract of proceedings. Ordinary general meeting. 26th November 1969. *Proceedings of the Linnaean Society of New South Wales* 94(3): 292–295.

Whitley, G.P., & J. Allan, 1958. *The Sea-Horse and its Relatives*. Melbourne: Georgian House.

Manuscript received: 20 July 2000, revised 21 February 2001 and accepted 27 February 2001.

Associate Editor: J.M. Leis.

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