

A REMARKABLE NEW PYGMY SEAHORSE (SYNGNATHIDAE: *HIPPOCAMPUS*) FROM
SOUTH-EASTERN AUSTRALIA, WITH A REDESCRIPTION OF *H. BARGIBANTI*
WHITLEY FROM NEW CALEDONIA

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Abstract

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A new syngnathid fish, *Hippocampus minotaur*, is described from southeastern Australia. It can be distinguished from congeners by its prominent head and distinctive thick 'neck', tiny dorsal fin with only 7 rays, low number of pectoral fin rays (11), low number of trunk segments (8), lack of definition of trunk and caudal segments and lack of inferior and median ventral trunk ridges. It appears to be restricted to mid-continental shelf depths. A complete description of the New Caledonian *H. bargibanti* Whitley, 1970 is also presented.

Introduction

Species of *Hippocampus* (family Syngnathidae), widely referred to as seahorses, are extremely variable (e.g., Ginsburg, 1937). Their well publicised male brooding habits have been responsible for a low rate of dispersal and consequent clinal variation in at least some populations. In such cases, subpopulations have occasionally been recognised as separate species. Although a comprehensive generic revision of *Hippocampus* is still to come, the perception that the genus is less diverse and species are more widely distributed than long thought is obvious from treatments that have appeared in regional studies over the last 15 years (e.g., Vari, 1982, Dawson, 1986a, 1986b, 1994). Nevertheless, previously unrecognised taxa do occur. One example is an extraordinary, diminutive, southeastern Australian species which occurs at depths that are generally greater than those inhabited by its sympatric congeners. A description of the species is presented here, bringing the number of currently recognised Australian representatives of the genus to seven. The new species is similar in many regards to the New Caledonian *H. bargibanti* Whitley, 1970, described in a brief note in the abstracts of an ordinary meeting of the Linnaean Society of New South Wales. A detailed description of that species is also provided.

Methodology follows that of Vari (1982), except that a camera lucida on a binocular microscope was used to make tracings from which proportional measurements were

recorded. Because of the fleshy nature of the two species treated and the reduction in ossification of their trunk and tail segments, it is not possible to report the numbers of segments based on external features, such as tubercles on the lateral trunk ridge. A comparison of body segments, determined as described by Vari (1982), with vertebrae in *H. abdominalis* and *H. breviceps* revealed that the first two precaudal vertebrae are not represented by tubercles on the lateral trunk ridge. The numbers of trunk segments as reported by previous workers is therefore assumed to be two fewer than the numbers of precaudal vertebrae. The numbers of tail segments in the two species are equal to the numbers of caudal vertebrae. In the following descriptions, the numbers of trunk and tail segments reported were calculated on the basis of the numbers of precaudal and caudal vertebrae observed on radiographs. The descriptions of the two species are of the holotype and lectotype; variations observed in paratypes, paralectotypes and other material are noted in parentheses. All body lengths are reported as millimeters total length (TL) as recorded by Vari (1982). The snout, orbit and post orbital lengths are compared with the head length (HL).

Specimens are from the collections of the Australian Museum, Sydney (AMS) and the Museum of Victoria, Melbourne (NMV). In addition to specimens of *H. bargibanti* and *H. minotaur* mentioned in the descriptions below, the following material was examined for this study: *H. abdominalis*: NMV A2899 (42.6, immature male?) Victoria, Port Phillip Bay,

Rye; NMV A8945 (60.5, female) South Australia, Point Sinclair; NMV A8975 (56.1, male) Victoria, off Lakes Entrance; NMV A14219 (12: 13.2–14.5, juveniles) Victoria, Port Phillip Bay, aquarium bred; *H. angustus*: AMS I.35463–001 (18.2, juvenile) Western Australia, entrance to Swan Estuary; *H. breviceps*: NMV A2898 (3: 23.2–28.6, juveniles) Victoria, Port Phillip Bay, Rye; NMV A11099 (48.4, male) Victoria, southern Port Phillip; NMV A11469 (2: 45.8–57.2, male and female) Victoria, Port Welshpool Jetty; NMV A14180 (2: 15.4–22.9, juveniles) Victoria, Western Port; *H. whitei*: AMS I.28289–002 (16.6, juvenile) New South Wales, Lake Macquarie.

Hippocampus minotaur sp. nov.

bullneck seahorse

Figures 1, 2a, 3a

Material examined. Holotype. NMV A192 (48.7, male), Australia, New South Wales, off Eden, 35–40 fm (64–73 m), 30 Dec 1960, Danish seine trawl, R. Slack-Smith.

Paratypes. NSW. AMS IA.3509 (42.2, female), coast of NSW, trawled; AMS IA.3560 (52.6, female), 8 mi E of Eden, 50–60 fm (91.5–109.8 m).

Vic. NMV A14161 (19.2, juvenile), Bass Strait, 38 km SW of Cape Paterson, 38°56.4'S, 145°16.6'E, 70 m, fine sandy bottom, 12 Nov 1981, RV *Tangaroa*, R. Wilson.

Diagnosis. 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.

Description. Head prominent, rather immobile, maintained at an angle of about 90° to axis of trunk; head length 16.4 (16.7–21.3)% TL; snout very short, 29.3 (28.0–31.1)% HL; orbital diameter 25.6 (20.3–24.4)% HL; postorbital length 46.3 (47.7–48.8)% HL; dermal flaps absent; coronet low, appearing as a shallow mound; 'neck' extremely deep (= broad), only slightly shallower than head depth; head and body very fleshy, segments indistinct in fresh material, devoid of prominent spines or tubercles; fleshy filaments absent; ventral portion of trunk segments incomplete; inferior trunk ridge and median ventral trunk ridge absent; other trunk and tail ridges very poorly developed, remnants of lateral trunk and inferior tail ridges not perceptibly confluent, remnants of superior trunk and tail ridges overlapping on ultimate trunk segment; trunk segments 8; caudal segments 41; first

caudal segment quadrangular; last trunk segment incomplete; trunk short, 31.0 (31.3–36.4)% TL; abdomen very broad, 19.7 (14.6–15.9)% TL; pouch in brooding males occupying most of abdominal cavity, positioned opposite last two trunk segments and first five caudal segments; dorsal fin tiny, with 7 rays, base extremely short, 2.0 (2.6–3.8)% TL, situated at juncture of last trunk segment and first caudal segment, totally confined to posterior and anterior portions of these segments respectively (subdorsal rings 2); pectoral fin rays 11; anal fin rays 4, vestigial or absent in adults. Colour in preservative, mostly cream, speckled with tiny brown dots with cream centres (remaining specimens mostly brownish). Life colors unavailable.

Etymology. *Minotaur* (noun in apposition), a mythical creature with the head of a bull and the body of a human, referring to the contrasting massive bull-like head and graceful trunk and tail of this species.

Distribution and ecology. Specimens for which detailed collection information is available came from off Eden, New South Wales, and southwest of Cape Paterson, Victoria. A. Steffe (personal communication) has indicated that the species has also been taken in environmental monitoring surveys off Wollongong, NSW. One of the paratypes was recorded as having been collected on a bottom with 'fine sand'.

Remarks. The prominent head with very short snout, relatively thick 'neck' region and tiny dorsal fin supported by only seven rays make this diminutive species unmistakable. Its very low numbers of dorsal and pectoral fin rays in comparison with other recognised species of the genus (Fig. 4) approach those of several other 'pygmy' species, such as the Western Atlantic *H. zosteræ* Jordan and Gilbert, 1882, the Japanese *H. coronatus* Temminck and Schlegel, 1850, and the New Caledonian *H. bargibanti* Whitley, 1970. Similarities between some of these species may be pedomorphic. Like two of its three sympatric congeners, *H. minotaur* has a high number of caudal segments, its value overlapping those of *H. breviceps* and being just less than in *H. abdominalis*. *Hippocampus abdominalis* has the highest numbers of caudal segments in the genus. The number in *H. minotaur*, however, does overlap with those of the Chinese *H. tatakuræ* and the Indo-Pacific *H. trimaculatus*.

Hippocampus minotaur shares with the unusual *H. bargibanti* the lack of any obvious demarcation of body segments and a great reduction of

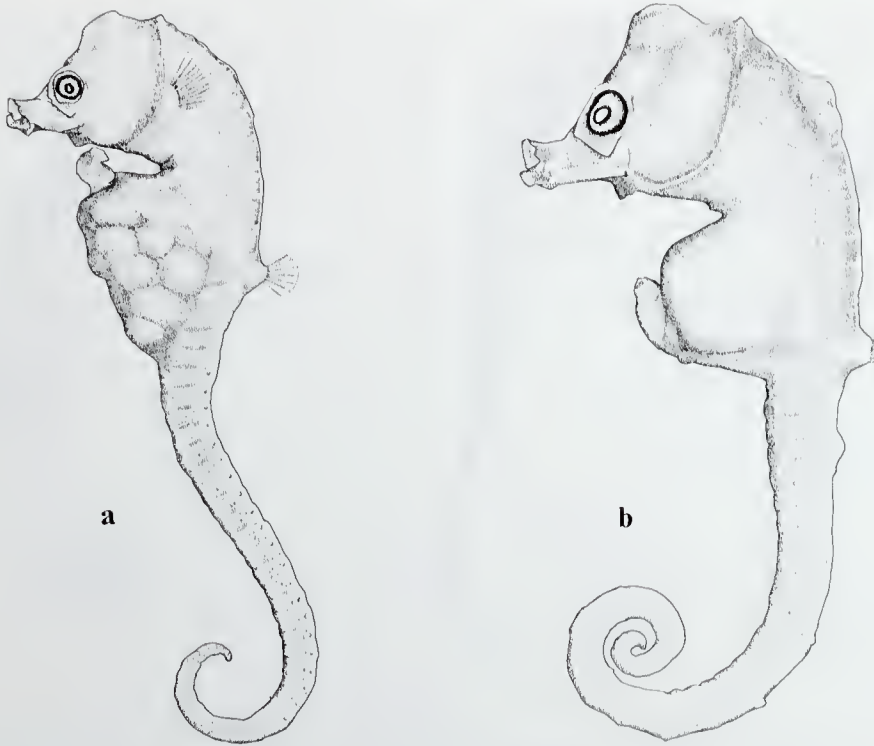


Figure 1. *Hippocampus minotaur* sp. nov. a, holotype, NMV A192, male, 48.7 mm TL, and b, paratype, AMS IA.3509, female, 42.2 mm TL. Scale = 5 mm.



Figure 2. Radiographs: a, *Hippocampus minotaur* sp. nov., holotype, NMV A192, male, 48.7 mm TL; b, *Hippocampus bargibanti* lectotype, AMS I.15418-002, 20.9 mm TL; c, *Hippocampus breviceps* NMV A2898, 27.4 mm TL.

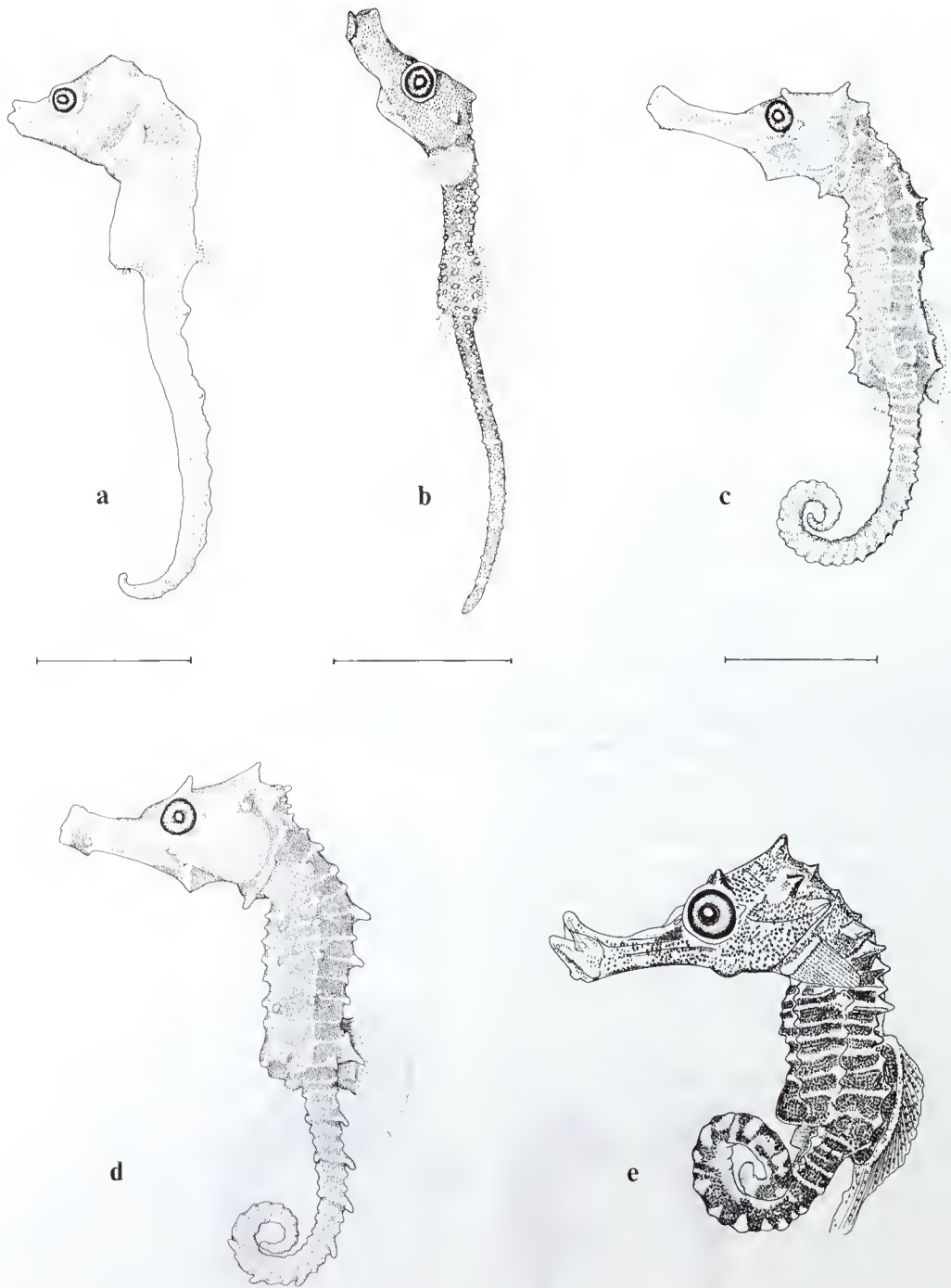


Figure 3. Juveniles of temperate Australian species of *Hippocampus*: a, *Hippocampus minotaur* sp. nov., paratype, NMV A14161, 19.2 mm TL; b, *Hippocampus abdominalis*, NMV A14219, 14.0 mm TL; c, *Hippocampus breviceps*, NMV A14180, 22.9 mm TL; d, *Hippocampus whitei*, AMS I.28289-002, 16.6 mm TL; e, *Hippocampus angustus*, AMS I.35463-001, 18.2 mm TL. Scale = 5 mm.

both ventral trunk ridges and the lower portions of trunk segments, as well as an abbreviated snout, a reduction in the constriction separating the head from the body, and small size. *Hippocampus minotaur* and *H. bargibanti* differ from other previously described members of the genus in having the ventral portions of the trunk segments sufficiently reduced that they no longer have the segmented appearance typical of syngnathids (Fig. 2c). In *H. bargibanti* dermal ossifications on the belly are reduced to unconnected star-like plates (Fig. 2b). In *H. minotaur*, dermal ossifications are absent in this region, the only visible remnant of the posterior trunk segments ventrally in radiographs of females being a crescentic process curving posteriorly and ventrally from the position of the lateral trunk ridge of the last trunk segment. This may provide structural support to the posterior margin of the 'belly'. In the holotype of this species, a brooding male, the ossified process curves anteriorly and ventrally and separates the anterior margin of the brood pouch from the thoracic cavity. The level of the process in this specimen is near the centre of the second penultimate trunk segment (Fig. 2a). The space remaining for abdominal organs in the holotype is in a narrow strip of the trunk anteriorly.

Despite the disparity in their number of caudal segments, the modifications shared by *H. minotaur* and *H. bargibanti* support the hypothesis that they are sister species. Other superficial features may provide further evidence for such a relationship. In the paratypes of *H. minotaur*, noticeable bud-like processes somewhat reminiscent of those on the body of *H. bargibanti* are present on the dorsal surface of the tail. In the latter, the bumps closely resemble the polyps of the gorgonian coral (*Muricella* sp.) to which it has been observed to cling and apparently which it mimics in life (Whitley, 1970). The structures in *H. minotaur* may provide a similar form of camouflage, especially if the species is found in association with southern soft corals. Unfortunately, collection information for type specimens of *H. minotaur* is insufficiently detailed to be able to assess this possibility.

Even at a very small size, *H. minotaur* is readily separable from its sympatric congeners by its very short snout and absence of readily recognisable body segments or associated spinous ornamentation (Fig. 3a). The shortsnout seahorse *H. breviceps* (Fig. 3c) at this size has an extremely elongate snout, comparable with those in *H. abdominalis* (Fig. 3b), *H. whitei* (Fig. 3d) and the warm temperate Western Australian

H. angustus (Fig. 3e), even though the last three species have a comparatively longer snout than *H. breviceps* in adults. *Hippocampus abdominalis*, *H. breviceps* and *H. whitei*, which co-occur in southeastern Australian are easily separated at all sizes by their dorsal fin ray and caudal segment counts. *Hippocampus angustus* is separable from *H. abdominalis* and *H. breviceps* by caudal segment counts (Fig. 4).

Hippocampus bargibanti Whitley, 1970

Figures 2b, 5, 6

Hippocampus bargibanti Whitley, 1970: 294. — Burgess et al., 1988: pl.79, bottom.

Material examined. Lectotype: AMS I.15418-002 (20.9, female), New Caledonia, Nouméa, on gorgonian coral *Muricella* sp., 30 m, July 1969, collected by Georges Bargibant.

Paralectotype: AMS I.15418-001 (19.5 mm TL, female), same collection information as lectotype.

Other specimens: New Caledonia. AMS I.15997-001 (2: 21.4-22.0, male and female), off Nouméa, Canal Woodin, 20-25 m, 26 Sep 1971, S. Catala; AMS I.19834-001 (24.2, female), Nouméa lagoon, Jul 1969.

Diagnosis. Dorsal fin rays 14; pectoral fin rays 10; anal fin absent in adults; very weak constriction separating head and body; head and body extremely fleshy mostly without recognisable bony segments, body ornamentation in the form of prominent bulbous tubercles; ventral trunk ridges poorly developed.

Description. Head moderately large, with restricted movement, held at an angle of about 90° to axis of trunk; head length 19.6 (16.9-19.2)% TL; snout extremely short 34.1 (24.4-28.6)% HL, with dorsal constriction midway between tip and eye giving tip a bulbous appearance; orbital diameter 26.8 (19.5-24.4)% HL; postorbital length 61.0 (51.4-61.0)% HL; prominent fleshy bulbous spine above each eye, smaller crest-like spine on dorsal midline of head in front of eye; small blunt spine centrally on cheek below posterior half of eye; slightly larger blunt spine on ventral midline of head below posterior margin of eye; corona prominent with broad base and broadly flattened apex; prominent fleshy bulbous spine on each side of head below forward half of corona, level with upper edge of eye; slightly smaller spine immediately preceding lower half of pectoral fin base; extremely prominent fleshy bulbous spines based on dorsal trunk ridge at about first, fifth and twelfth segments, the last pair on either side of dorsal fin base between seventh and tenth rays; fleshy bulbous

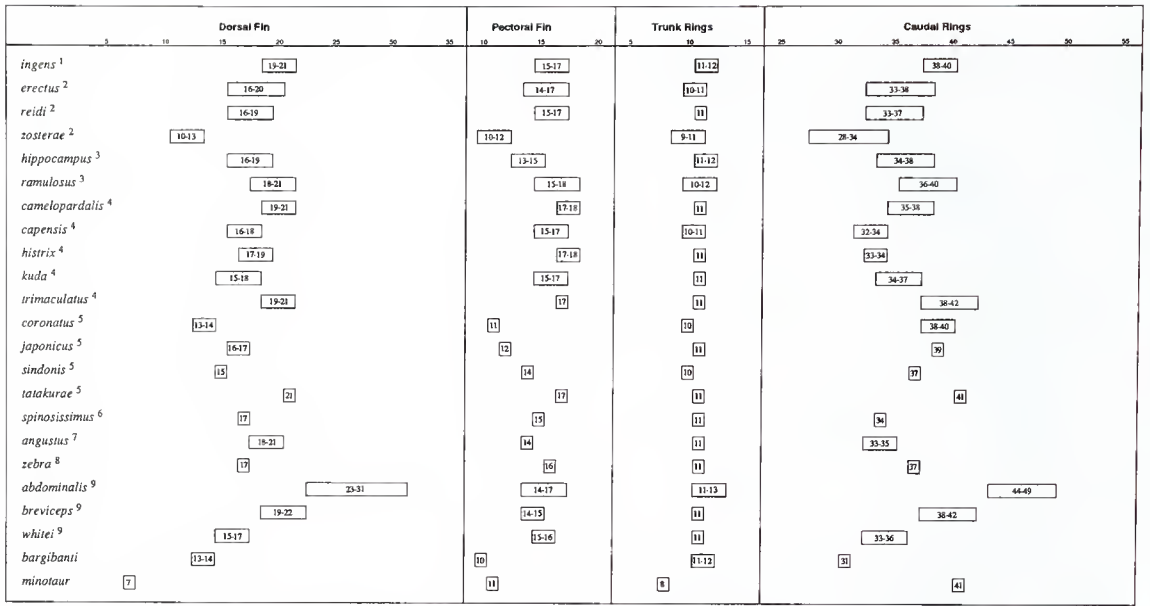


Figure 4. Selected meristic values for species of *Hippocampus*. Meristic values shown came from: 1 Ginsburg, 1937, 2 Vari, 1982, 3 Dawson, 1986b, 4 Dawson, 1986a, 5 Masuda et al., 1984, 6 Weber and de Beaufort, 1922, 7 Günther, 1870, 8 Whitley, 1964 and 9 Dawson, 1994.



Figure 5. *Hippocampus bargibanti* Whitley, 1970, lectotype, AMS I.15418-002, 20.9 mm TL, female. Scale = 5 mm.



Figure 6. *Hippocampus bargibanti* Whitley, 1970, on *Muricella* sp.

process on lateral trunk ridge at eighth trunk segment; similar process immediately ventrad; lower, broader process on ventral profile of 'belly' flanking anus on last trunk segment; several smaller, low, blunt, fleshy spines scattered on belly; dermal filaments absent; 'neck' broad, depth at constriction only slightly less than head depth; ventral portion of trunk segments incomplete; inferior trunk ridge and median ventral trunk ridge reduced to star-shaped, embedded, dermal ossifications anteriorly, ossifications forming structural bases for low fleshy spines on belly, posteriormost two trunk segments more completely ossified; other trunk and tail ridges very poorly developed, remnants of lateral trunk and inferior tail ridges not perceptively confluent, remnants of superior trunk and tail ridges apparently overlapping on ultimate trunk segment; trunk segments 12; caudal segments 31; first caudal segment quadrangular; last trunk segment incomplete; trunk of moderate length 43.1 (36.4–41.0)% TL; abdomen broad, 15.3 (12.4–20.6)% TL; pouch structure unknown; dorsal fin small, with 14 rays, base distinctly angled, the anterior end positioned much more ventrally than posterior end, length 11.0 (9.1–9.8)% TL, situated above last 2.5 trunk segments and first caudal segment (subdorsal rings 3.5); pectoral fin rays 10; anal fin rays absent in adults. Colour in preservative mostly cream. In life, variable depending on color of *Muricella* sp. with which it is living. Types "creamy white with spaced orange-yellow streaks becoming ring-like on the tail, and the bumps over its head (coronet and nuchal plates) and along the body segments imitate the yellow and orange clumps of spicules of the gorgonian" (Whitley, 1970). Others greyish white with scarlet markings (Fig. 6).

Distribution and ecology. So far, only known from New Caledonia where it has been taken solely on the gorgonian *Muricella* sp.

Remarks. Whitley (1970) did not select a holotype from the syntypic series. The larger, AMS I.15418–002 (Fig. 5), is here designated lectotype. The specimen registered as AMS I.19834–001 was apparently collected at the same time as the two types but was not sent to the AMS until after Whitley had published his description (J. Paxton, personal communication).

Although seahorses are known for their cryptic appearance, few, if any, have developed the extreme protective coloration and morphology of *H. bargibanti*. The resemblance of this species to the gorgonian with which it lives is so close

that the type series was only noticed after a stalk of gorgonian was collected and placed in an aquarium (J. Paxton, personal communication). Subsequent specimens of *H. bargibanti* have been taken by targeting its more highly visible gorgonian partner.

The five specimens examined are very similar morphologically. Although none has the obvious external pouch development found in other species of the genus, one of the three non-type specimens examined by A. Vincent and J. Pritchard (personal communication) is a male. It differs slightly from the other four in the ossified posterior trunk segments that are directed perpendicularly from the vertebral column (as observed in radiographs) with one of the ventral ossifications expanded basally. This difference is considerably less pronounced than observed in other species of the genus. The inflated appearance of the trunk in most of the specimens of *H. bargibanti* may be related to the reduced ossification of the more anterior segments and thus the greater flexibility of the region.

Discussion

Sufficient evidence appears to exist to recognise *H. bargibanti* and *H. minotaur* as constituting a monophyletic lineage (see *H. minotaur* 'Remarks'). The temptation to propose a new generic name for the two is resisted because little information is available on the overall interrelationships of the species currently referred to *Hippocampus*.

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