

# A new species of blenny, *Cirripectes heemstraorum*, from Cape Vidal, South Africa (Family Blenniidae)

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**ABSTRACT.** *Cirripectes heemstraorum* sp. nov. is described from three specimens recently collected on the DAR 1 artificial reef in the iSimangaliso Wetland Park, off the east coast of South Africa at Cape Vidal. It is closely related to *C. auritus*, but is easily distinguished by its distinctive coloration. Females have a dark brown body with small spots over the posterior half to three quarters of the body and a brilliant yellow (pale in preservative) caudal fin; whereas in female *C. auritus* the body and the caudal fin are the same color with no contrasting dark to pale change between body and caudal fin. Male resembles female *C. heemstraorum*, but the caudal fin of males is dark brown basally with only the outer half of fin brilliant yellow (pale in preservative) and the small black spots on the caudal peduncle of the male coalesce into 2–3 short black stripes terminating on the base of the caudal fin. Male *C. auritus* lack black stripes at the base of the caudal fin and have the body and caudal fin uniformly dusky (pink, yellow or beige colored in life).

**RÉSUMÉ.** *Cirripectes heemstraorum* sp. nov. est décrit à partir des trois exemples récemment retrouvées dans le DAR 1 un filon artificiel dans le iSimangaliso Wetland parc de la partie orientale de l'Afrique du Sud au Cap Vidale. C'est un tout peu comme la famille *C. auritus* mais c'est facilement distinctif par ses couleurs particulières. Les femelles ont un corps de couleur brun foncé avec de petites taches dans la partie supérieure du corps et une couleur jaune brillant à la nageoire pendant que la femelle *C. auritus* a un corps et une nageoire de même couleur pas de contraste entre le noir et la couleur pâle entre le corps et la nageoire. Le mâle ressemble à la femelle *C. heemstraorum* mais la nageoire du mâle est fondamentalement brun foncé avec une moitié extérieure de la nageoire en jaune brillant (pâle de conservation) et de petites taches noires sur la nageoire avec deux ou trois rayures noires au bout et sur le fond de la nageoire. Le mâle *C. auritus* par manque de rayures noires, a la partie inférieure de la nageoire et aussi le corps et la nageoire uniformément foncé (rose, jaune ou beige).

**KEYWORDS:** Blenniidae; South Africa; *Cirripectes heemstraorum*; new species

## INTRODUCTION

Williams (1988) revised the Indo-Pacific blenniid fish genus *Cirripectes*, in which he recognized 21 species. Recent collections of fishes from Cape Vidal, KwaZulu-Natal, South Africa, include three specimens, a male and two females, similar in appearance to *C. auritus* Carlson, 1981. Unlike *C. auritus*, all three Cape Vidal specimens have dark brown bodies and brilliant yellow caudal fins in life (Fig. 1). Comparison of these specimens with specimens of *C. auritus* reveals that the Cape Vidal specimens represent an undescribed species currently known only from South Africa.

## METHODS

Counts (when variable, values for each specimen are given separately with value of holotype in brackets): dorsal-fin elements consist of unsegmented, flexible rays (the last shortest) treated as spines (roman numerals) followed posteriorly by unbranched segmented rays

(last spine and first segmented ray share common pterygiophore), posteriormost two rays borne by separate pterygiophores and counted as two rays; anal-fin elements include two flexible spines (spines of sexually mature males enveloped in fleshy rugosities); females with first of two spines embedded in swollen tissue behind gonopore (first spine visible only in osteological preparations) with second spine followed by flexible unbranched segmented rays, posteriormost ray of males and females appears as two rays split through the base, but borne by a single pterygiophore (terminal split ray counted as single ray); pelvic fins each with one greatly reduced, embedded spine (visible only in osteological preparations) and four segmented rays, innermost ray more slender and shorter than others, and closely applied to third ray making it difficult to distinguish; procurrent caudal-fin rays are small unsegmented rays located dorsally and ventrally in advance of segmented caudal-fin rays (middle nine segmented rays usually branched, upper two and lower two segmented rays simple); number of vertebrae are presented as a formula, precaudal + caudal = total vertebrae; position of the last three anal-fin pterygiophores is given as a formula representing the

number of pterygiophores occupying the last three pterygiophore-occupied interhemal spaces (1-1-2 means there is 1 pterygiophore in each of the 2 anterior spaces and 2 in the last space); nuchal cirri counts are of the number of cirri bases and the number of free tips for the fringe of cirri on the nuchal flaps; supraorbital and nasal cirri counts include all free tips (total of both sides); number of lateral line (LL) tubes includes only unconnected, bipored tubes on the left side (tubes begin at the end of the continuous part of the LL canal; the position of the last tube can be highly variable within a species); gill raker counts are of the total number of rakers on the first arch. Counts of the rays of the median fins and characters associated with the vertebral column (i.e. pleural ribs, epineurals, etc.) were taken from radiographs. When the last anal-fin ray was split through its base, yet borne by one pterygiophore,

it was counted as 1.

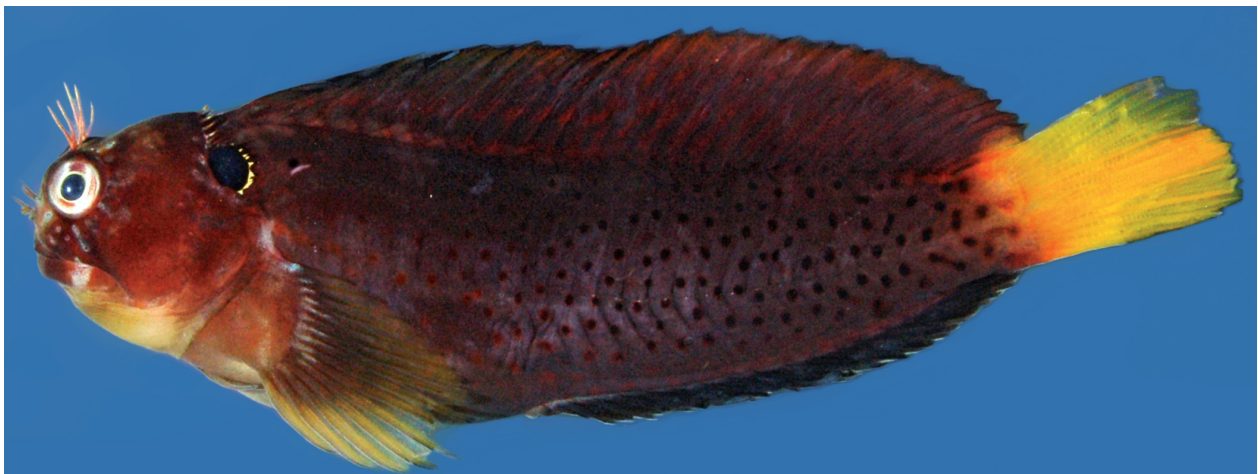
A pore position in a sensory pore series refers to all pores that can be traced back to a single branch from one of the main sensory canals of the cephalic lateralis system. Pore positions are characterized as simple (1 or 2 pores at each position), or complex (3 to 20 pores closely grouped together at each position; see Williams 1988: Fig. 6).

Method of taking measurements was conventional, but the soft bodies of the scaleless blennies make most measurements unreliable and of little or no taxonomic value due to their variability. SL refers to standard length.

Specimens are deposited in the South African Institute of Aquatic Biodiversity (SAIAB) and the Division of Fishes, National Museum of Natural History, Smithsonian Institution (USNM).



**Fig. 1.** Underwater photo of a female *Cirripectes heemstraorum* photographed by Dennis King on the DAR-1 artificial reef, iSimangaliso Wetland Park, Cape Vidal, South Africa.



**Fig. 2.** Photograph of a freshly dead female paratype of *Cirripectes heemstraorum* (54 mm SL, USNM 396714, photographed by Phil Heemstra).

*Cirripectes heemstraorum* sp. nov.

Common Name: Yellowtail blenny

Figs. 1, 2

**Holotype.** SAIAB 83624, female: 70.6 mm SL, South Africa, KwaZulu-Natal, iSimangaliso Wetland Park, Cape Vidal, 28° 09.660' S, 32° 33.685' E, collected on an artificial reef (the DAR 1 barge, sunk on 6 Dec 2008), at 17 m depth, 4 June 2009, Field number PCH09-CV-03, Collectors: Phil and Elaine Heemstra, Guy Musson, Angus W. Paterson, et al. (SAIAB tissue number HM09-75).

**Paratypes** (all collected with the holotype): SAIAB 83881, male: 48.5 mm SL, (SAIAB tissue number HM09-76); and USNM 396714, female: 53.5 mm SL.

**DIAGNOSIS.** A species of *Cirripectes* with the following combination of characters: nape with greatly expanded black nuchal flap on either side, 10–13 independently based cirri distributed between the nuchal flaps, dorsal fin entire, total supraorbital cirri 5–6, total nasal cirri 6–8, males with small dark spots posteriorly on body coalescing into short black stripes on caudal peduncle, caudal fin of females brilliant yellow (pale in preservative; contrasting sharply with dark brown body), males with outer half of caudal fin brilliant yellow.

**DESCRIPTION** (values for each specimen provided where variable, holotype's value in brackets for variable characters). Dorsal-fin rays XII, 16; anal-fin rays II, 17; total procurrent caudal-fin rays 12; caudal-fin rays 13; pelvic-fin rays I, 4; vertebrae 10 + 22 = 32; last pleural ribs on vertebral centrum 11; last epineural on vertebral centrum 15, 16, [17]; anal pterygiophores 1-1-2; total nuchal cirri 30, 34, [51]; supraorbital cirri [5], 6, 6; nasal cirri 6, 7, [8]; LL tubes 4, 10, [14]; last LL tube positioned at point beneath vertical from dorsal-fin ray 4, 10, [16]; no scale-like flaps along LL; lower lip smooth mesially and plicate laterally; gill rakers 21, [22], 25; pseudobranchial filaments on left side 6, 8, [9]; upper lip crenulae approximately 30, 33, [35]; nuchal cirri arrangement consisting of 10, [11], 13 independent cirri distributed between 2 greatly expanded nuchal flaps, each bearing 9, 11, [20] minute cirri on left side and 11, 13, [19] on right side; first dorsal-fin spine of adults approximately equal to second (males and females); dorsal fin entire, not incised above last dorsal-fin spine; dorsal-fin membrane attached to caudal peduncle in advance of base of caudal fin; cephalic pore system simple (1–2 pores at most positions); mid-snout pores present; extra interorbital pore position absent; pore positions behind each nuchal flap 2; male genital papilla with urogenital orifice located basally between 2 widely separated slender filaments (less than 1.0 mm long) on a fleshy swelling behind anus; fleshy anal spine rugosities of male black and arranged in longitudinal rows of uniform fleshy ridges; maximum SL about 71 mm SL.

**Colour in alcohol.** Male body colouration dark brown with tiny dark blackish brown spots on posterior ½ to

¾ of body with spots posteriorly on body coalescing into short black stripes on caudal peduncle; head brown with pale bar on upper lip on each side, short pale streaks radiate from eye; underside of head with inconspicuous broad brown band across throat; dorsal and anal fins dark brown; anal-fin rugosities black; caudal fin dusky brown over basal half with outer half of fin pale; pectoral and pelvic fins brown; nuchal flap black with narrow fringe of pale cirri, the independently based cirri between flaps brown to black; supraorbital and nasal cirri brown.

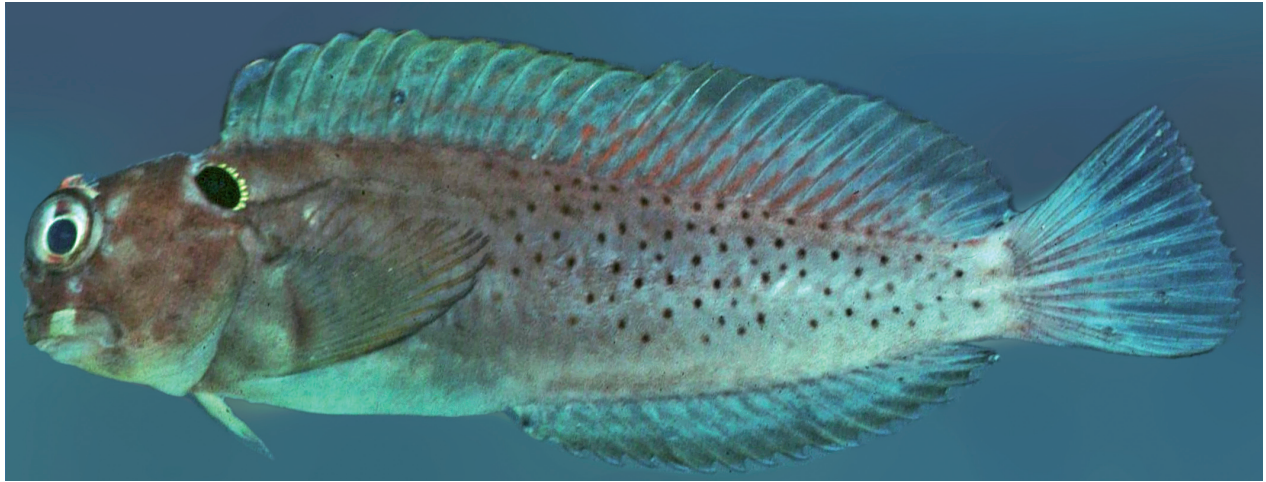
Females similar to males except spots on caudal peduncle do not coalesce into stripes; caudal fin pale from base to distal margin with fine streak of melanophores along dorsal and ventral margins; no fleshy rugosities on anal spines.

**Colour in life** (based on colour photos of one male ([http://saiab.ac.za/ImageWeb/10418\\_HM09-076.jpg](http://saiab.ac.za/ImageWeb/10418_HM09-076.jpg)) and of several female specimens from Cape Vidal, South Africa; Figs. 1, 2): female with head brown and body dark brown, the head with bluish white spots on snout and around eye, and small reddish brown spots on side of head and anteriorly on body, small scattered spots becoming dark brown to black at mid body and continuing to base of caudal fin; dark brown coloration ending abruptly at caudal-fin base; caudal fin brilliant yellow, contrasting sharply with brown body; dorsal fin dark brown with inconspicuous reddish brown spots on spines and rays and narrow blackish margin; anal fin black with tips of rays grayish blue; pectoral fins yellowish brown; pelvic fins brown; nuchal flap purplish black, bearing tiny yellow cirri, cirri between flaps yellowish brown; supraorbital and nasal cirri pinkish; iris with narrow yellowish inner ring and irregular reddish brown outer ring.

Male similar to female except blackish brown body color extends posteriorly as a rounded dark area covering basal half of caudal fin with posterior half of fin brilliant yellow; rugosities on anal-fin spines bluish black.

**DISTRIBUTION.** Known only from Cape Vidal, South Africa. The closely related *Cirripectes auritus* (Figure 3) has been collected 66 km to the north at Sodwana Bay, South Africa, but the two species have not been observed living sympatrically.

**COMPARISONS.** *Cirripectes heemstraorum*, *C. auritus* and *C. kuwamurai* Fukao 1984, differ from their congeners in having a greatly expanded black nuchal flap with a fringe of minute yellow cirri on either side of the nape and independently based cirri in a row across the nape between the flaps. Although large nuchal flaps are present in members of the *C. fuscoguttatus* group (as diagnosed by Williams 1988), the flaps of species in this group bear well-developed black cirri and the cirri between the nuchal flaps are connected at their bases by a low basal membrane (Williams 1988: Fig. 2). *Cirripectes heemstraorum* and *C. auritus* differ from *C. kuwamurai* (known only from Japan) in having the dorsal fin entire (vs notched over dorsal spine XII); supraorbital cirri 2–7 (vs 12); nasal cirri 4–8 (vs 10); and small dark spots posteriorly on body (vs narrow pale



**Fig. 3.** Photograph of a freshly dead male *Cirripectes auritus* (35 mm SL SAIAB 8888 Sodwana Bay, photographed by Phil Heemstra).

stripes, red in life, on posterior three-fourths of body; Williams 1988: Plate IV, C).

*Cirripectes heemstraorum* (Figs. 1, 2) differs from *C. auritus* (Fig. 3; and Williams 1988: Plate I, D-G) by having brown pelvic fins (vs pale or dusky); dark brown head and body (vs tan or irregularly barred anteriorly and pale to pinkish posteriorly); females and males having a yellow caudal fin (vs pale, yellowish or pinkish); males with short black stripes on caudal peduncle (vs distinct small spots) and male anal spine rugosities black with uniform rows of fleshy folds (vs pale with irregularly rugose swellings). The single specimen of *C. auritus* known from the Philippines (a 32 mm SL female; USNM 222490) also has a brown body in preservative. The Philippine specimen of *C. auritus* differs from *C. heemstraorum* by its body being a much paler shade of brown and body coloration becoming paler posteriorly as it gradually transitions into a dusky brown caudal-fin (vs caudal fin pale and contrasting sharply with dark brown body); and the pelvic fins being dusky (vs brown).

**ETYMOLOGY.** The new species is named in honor of Phil and Elaine Heemstra, in recognition of their contributions to our knowledge of marine fishes, particularly from South Africa, who collected all of the known specimens of the new species and provided a color photograph showing the life colors (Fig. 2).

**REMARKS.** Elaine Heemstra provided the following information on environmental conditions at the type locality.

"... The Cape Vidal *Cirripectes* were found on a new artificial reef – 2 barges that were sunk at the end of last year. The shallower of the 2 barges, DAR 1, where the *Cirripectes* were collected, was sunk on the 16th December 2008. Its bow deck is at about 17 m deep and the barge gets shallower towards the stern; the substrate upon which the barge sits is about 26 m. DAR 2 at 27–30 m (substrate ~ 42 m) was scuttled the month before. Benthic growth on both decks is predominantly barnacles (*Balanus* spp.) and a covering of loosely attached 'pearl oyster' type bivalves that are still to be identified. The benthic cover is denser on DAR 1

than DAR 2 and very few soft corals are present at this stage. The barges are on a sandy area that is exposed to fairly constant currents of 3–4 knots & the water was about 22–23° C [in early winter]. There was little or no current only about every 4th day that we were there. At Cape Vidal there is some shallow, patchy reef along the shoreline but only one offshore reef, known as Oscar's Reef, at ~35 m. The barges are isolated from other reefs, the closest, Oscar's Reef, being about 6 km north of the area."

The distinctive yellowtail blenny has not been observed previously by divers in the area (E. Heemstra pers. comm.) and the natural source population of the DAR 1 adult colonizers remains unknown. Potential areas to search for other populations of the yellowtail blenny would be high energy wave swept shores or reefs prone to dangerous fast currents where divers typically do not frequent.

DNA barcode sequences for the cytochrome c oxidase subunit1 gene (CO1) were obtained from tissue samples taken from the female holotype (SAIAB 83624, tube number HM09-75) and the male paratype (SAIAB 83881, tube number HM09-76). The CO1 sequences have been deposited in GenBank as accession numbers: GU357568 for SAIAB 83624; GU57569 for SAIAB 83881

**COMPARATIVE MATERIAL EXAMINED.** A total of 11 specimens of *C. auritus*, 28–71 mm SL, were examined. SOUTH AFRICA: SAIAB 8888, 38 mm; SAIAB 9547, 48 mm. Type material: BPBM 20478, 1: 71 mm, holotype, Line Islands, Fanning Island. Paratypes: ANSP 138366, 2: 43–48 mm, Line Islands, Fanning Island; CAS 34383, 2, Grand Comoro Island; CAS 48948, 28 mm, Line Islands, Christmas Island; USNM 22489, 2: 50–55 mm, Line Islands, Fanning Island; USNM 222490, 32 mm, Philippines, Apo Island.

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of the SAIAB specimens to the USNM. The expedition to collect specimens from the DAR 1 artificial reef at Cape Vidal was funded by the iSimangaliso Wetland Park. Phil and Elaine were supported by SAIAB and were assisted in the field by the South African Environmental Observation Network (SAEON) dive team. Dennis King has kindly allowed me to publish his underwater photo of a yellowtail blenny. The collections management staff of the Fish Division of the National Museum of Natural History, Smithsonian Institution, handled loan processing and cataloging. Mrs. Kholiwe Dubula and Ms. Unathi Lwana, both of SAIAB, provided specimens and tissue samples of the yellowtail blenny. Ali Gotz photographed the voucher specimens from which tissue samples were taken (photos available on the SAIAB web site). I thank Victor G. Springer and William F. Smith-Vaniz for their reviews and helpful suggestions for improvement of an earlier draft of the

manuscript. Lee Weigt and the staff of the Laboratories of Analytical Biology (LAB), National Museum of Natural History, Smithsonian Institution, performed the DNA extraction and purification and sequenced the CO1 gene for this study.

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