Pseudopentaceros richardsoni
Species Profile

SEAFO
South East Atlantic Fisheries Organisation

UPDATE

L.J. López-Abellán (IEO), I. Figueiredo (IPIMAR) and R. Sarralde (IEO) - 09/2009
L.J. López-Abellán (IEO) and R. Sarralde (IEO) – 02/2012
L.J. López-Abellán (IEO) 09/2014

IEO – Instituto Español de Oceanografía
IPIMAR – Instituto de Investigação das Pescas e do Mar

1. Taxomony

Phylum	Chordata
Subphylum	Vertebrata
Superclass	Osteichthyes
Class	Actinopterygii
Subclass	Neopterygii
Infraclass	Teleostei
Superorder	Acanthopterygii
Order	Perciformes
Suborder	Percoidei
Family	Pentacerotidae
Genus	*Pseudopentaceros* Bleeker, 1876
Species	*Pseudopentaceros Richardson* (Smith, 1844)
Synonyms	*Pentaceros richardsoni*
Common name	Pelagic armourhead (En) Southern boardfish (En) Tête casquée pélagique (Fr) Pez jabalí (Sp)
Species code	EDR *Pseudopentaceros richardsoni* EDW *Pseudopentaceros* spp.

2. Species characteristics

2.1 *Distribution*

The Pentacerotidae *Pseudopentaceros richardsoni* (Smith, 1844), commonly known as pelagic armourhead or southern boarfish, is a southern circumglobal, benthopelagic species inhabiting the waters over the outer shelf and slope (100-1000 m) between 0 and 1 000 meters depth. The species also inhabits seamounts and underwater ridges. Thus, *P. richardsoni* is located in the Southeast Atlantic (Tristan de Cunha, Walvis Ridge and South Africa); the Western Indian Ocean (South Africa and seamounts south of Madagascar) and the South Pacific (southern Australia, New Zealand and Cape Horn (Chile)).

The geographical distribution in the Southeast Atlantic Ocean is roughly represented in figure 1. The area would be located between 20ºS and 40ºS.

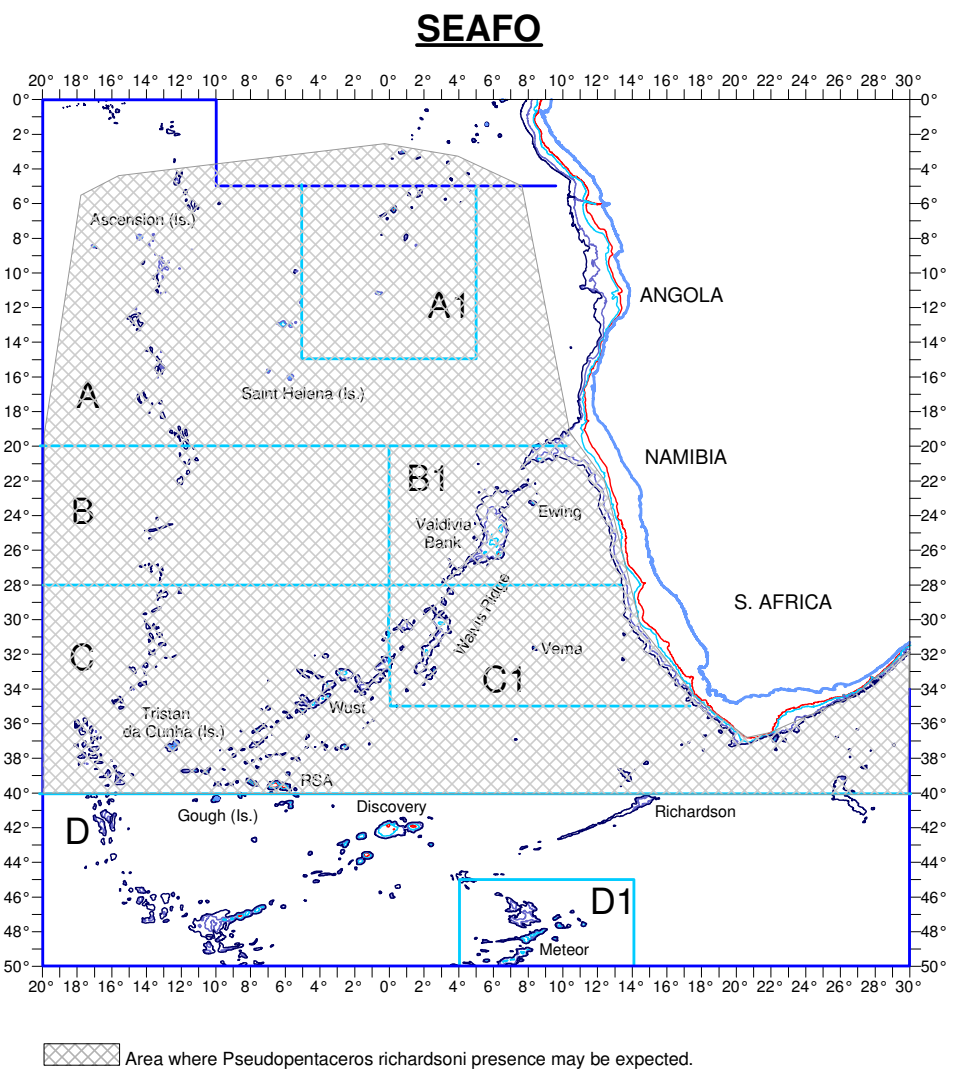

Figure 1.- Geographical distribution of *P.richardsoni* in the SEAFO region and adjacent waters.

2.2 *Habitat*

Adults inhabit the steep and flat hard bottoms up to 800 metres depth on the seamounts and underwater ridges in the open ocean. Eggs, larvae and juveniles are pelagic.

Northeast Walvis Ridge
Valdivia Bank
Filippov seamount
Vema seamount
Wust seamount

2.3 *Biological characteristics*

Studies on this species are very scarce and mainly related to distribution and species description (Borets, 1980; Kotlyar, 1882; Hardy, 1983; Heemstra, 1986; Humphreys and Tagami, 1986; Parin, 1992; Mundy and Moser, 1997). Literature is also a little confusing because, initially, only one species (*Pentaceros richardsoni*) was considered, instead of the three current species. Studies on the other two species distributed in the North Pacific

(*Pseudopentaceros pectoralis* and *Pseudopentaceros wheeleri*) have been more frequent.

Sort description of *P. richardsoni* extracted from Hardy (1983): Body strongly laterally compressed; dorsal profile slightly posteroventrally inclined under dorsal spines, rounding under dorsal rays to caudal peduncle; ventral profile posteroventrally inclined from lower jaw to pelvic fin base, flattened along belly to vent, posterodorsally inclined under anal spines and anteriormost anal rays, strongly rounded under posterior anal rays to caudal peduncle; belly strongly keeled between pelvic fin base and vent; snout-vent 1.3-1 in SL; depth at pelvic spine origin 2.2-2.6 in SL, at 1st anal spine 2.3-2.8 in SL; width at base of pelvic spine 7.1-13.8 in SL, at base of pectoral fin 6.0-8.2 in SL. **Colour.** Adult (from colour transparency): steel-blue to greyish-green over most of body; ventral surface paler; dorsal and anal fin webbing slightly darker bluish at distal edge than over remainder; pectoral and caudal fins dark; pelvic fins paler. Juvenile (in alcohol): dorsum dark, variously marbled with pale lines and spots; lower flanks paler, with irregular dark spots; webbing between dorsal and anal spines generally dark brown, with some pale patches, particularly at distal contact of web with succeeding spine; dorsal, anal, pectoral, and caudal fin rays pale; pelvic fins dark brown, with pale spots and streaks; belly pale.

Table 1. Growth parameters of *P. richardsoni* from the Southwest Indian Ocean.

Area	Sex	k	L_∞	t_o	Reference
Southwest Indian Ocean (Walters Shoals & Sapmer Seamount)	Both sexes	0.27	65.1	-0.34	López-Abellán *et al.* (2008)(*)

(*) Back-calculation

Estimates on length-weight relationship provided by a research experience conducted within the SEAFO CA in 2008 are presented in table 2:

Table 2. Parameters of the total length (cm) - total weight (g) relationship ($TW=aTL^b$) for males, females and all individuals of *Pseudopentaceros richardsoni* in Valdivia Bank (from López-Abellán *et al.*, 2008a).

	a	b	R^2	n	TL range (cm)	TW range (g)
Male	0.014	3.091	0.946	48	32.8-47.5	680-2190
Female	0.006	3.305	0.877	55	37.6-59.3	1004-4525
All individuals	0.010	3.172	0.959	103	32.8-59.3	680-4525

Other Life history data for specimens caught in the Southwest Indian Ocean seamounts (Walters Shoals & Sapmer Seamount) (López-Abellán *et al.*,2008): Maximum size (72.5 cm TL; female); Maximum age (14 years); Spawning season (October-December; sampling period), as 44% of females were at spawning stage and 48% at post-spawning.

No information is available on fecundity of *P. richardsoni*.

Regarding other species of the same genus from the North Pacific, *Pseudopentaceros wheeleri* spawning period began in early December and peaked during late December through January. In February, spawning had largely been completed and by March all mature females were spent. The hydration process and release of eggs are asynchronous. During spawning, eggs are released in four to six batches and average 20,000 per batch (Humphreys and Tagami, 1986). Borets (1979) reported that fecundity estimates of 30 cm long females from three SE-NHR seamounts ranged from 99,000 to 110,000 eggs. Studies of Yanagimoto and Humphreys (2005) on the reproductive cycle of female *Pseudopentaceros wheeleri* indicate that for this species spawning occurs between November and February.

No information on feeding and feeding periods is available. However, by similarity with other *Pseudopentaceros* species, *P. richardsoni* should feed on zooplankton, nekton and zoobenthos species (e.g. euphausiids, mysids, cephalopods, shrimps and bony fishes).

2.4 *Population structure*

Figure 2 shows the length frequency distribution of the species from catches taken in waters of Valdivia Bank in 2010-11 fishing season (SEAFO SC, 1011). The distribution is unimodal with a peak at about 43 cm of TL which means that individuals with ages around 4 years old (about 44 cm) are the most representatives in the catches.

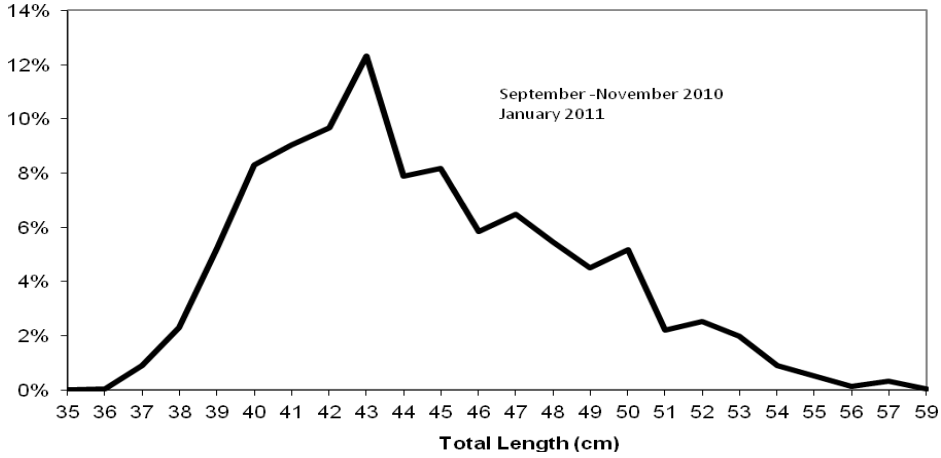

Figure 2.- *Pseudopentaceros richardsoni* : length frequency distribution raised to catches taken on Valdivia Bank in 2010-11 fishing season.

Results from a research survey conducted in the Valdivia Bank (López-Abellán *et al*., 2008a) provided a male to female sex ratio of 0.87:1; and the sex ratio by size shows that fishes greater than 48 cm TL are all females.

2.5 *Behavior and associated species*

Pseudopentaceros richardsoni is a predator trophic level 3.5 (s.e. 0.37) (Froese and Pauly, 2012 – FishBase). In the Pacific, the slender armorhead is eaten by the sei whales.

No information is available on distribution of juveniles of *P.richardsoni*, although it seems that larvae of *Pseudopentaceros* spp. are dispersed by surface currents away from the seamounts, where early development occur as pelagic near de surface before move to the demersal habitat (Humphreys and Tagami, 1986).

This species recruit and aggregates at the summit of the seamounts after approximately 4 years of pelagic life.

Associated species in the SEAFO CA:
Helicolenus mouchezi
Beryx splendens
Beryx decadactylus
Epigonus telescopus
Hyperoglyphe antartica
Schedophilus velaini
Mora moro
Polyprion americanus

2.6 *Resilience / productivity*

Medium

(k=0.27; t_m=4; t_{max}=14)

2.7 *Intrinsic vulnerability*

Moderate vulnerability (44 of 100)

(Froese and Pauly, 2012 – FishBase, based in Cheung *et al*, 2005; Cheung *et al*, 2007)

3. Other remarks

Not available.

4. References

Borets, L.A. (1980). The distribution and structure of the range of the boarfish *Pentaceros richardsoni*. *Ibid* 20 (3): 141-143.

Cheung W.W.L., T.J. Pitcher, D. Pauly (2005). A fuzzy logic expert system to estimate intrinsic extinction vulnerability of marine fishes to fishing. *Biological Conservation* 124: 97-111.

Cheung W.W.L., R. Watson, T. Morato, T.J. Pitcher and D. Pauly (2007). Intrinsic vulnerability in the global fish catch. *Marine Ecology Progress Series* 333: 1-12.

Froese, R. and D. Pauly. Editors (2012). FishBase. World Wide Web electronic publication. www.fishbase.org, version (02/2012).

Heemstra, P.C. (1986). Pentacerotidae. In 'Smiths' sea fishes'. (Eds Smith and Heemstra) pp. 622-623. (Springer-Verlag. Berlin).

Humphreys, R.L. (Jr), and Tagami, D.T. (1986). Review and current status of research on the biology and ecology of the genus *Pseudopentaceros*. In: *Environment and resources of seamounts in the North Pacific*. (Eds Uchida *et al*.) pp. 55-62. (NOAA Technical Report NMFS 43).

Hardy, G.S. (1983). A revision of the fishes of the family Pentacerotidae (Perciformes). *New Zealand Journal of Zoology* 10: 177-220.

Kotlyar, A.N. (1982). First finding of *Parazen pacificus* Kamohara (Zeidae) and *Pentaceros richardsoni* Smith (Pentacerotidae) in the Indian Ocean. (In Russian) *Bull. Mosk O-Va Ispyt Prir Otd Biol* 87(3): 34-36.

López-Abellán, L.J., M.T.G. Santamaría and J.F. González (2008). Approach to ageing and growth back-calculation based on the otolith of the southern boardfish Pseudopentaceros richardsoni (Smith, 1844) from the south-west Indian Ocean seamounts. *Marine and freshwater Research* 59: 269-278.1

López-Abellán, L.J., J.A.. Holtzhausen, L.M. Agudo, P. Jiménez, J. L. Sanz, M. González-Porto, S. Jiménez, P. Pascual, J. F. González, C. Presas, E. Fraile y M. Ferrer, 2008a. Preliminary report of the multidisciplinary research cruise on the Walvis Ridge seamounts (Atlantic Southeast-SEAFO). http://hdl.handle.net/10508/370, Part I-II: 191 pp.

Mundy, B.C., and Moser, H.G. (1997). Development of early stages of pelagic armorhead *Pseudopentaceros wheeleri* with notes on juvenile *Ps. richardsoni* and larval *Histiopterus typus* (Piscis, Percoidei, Pentacerotidae). *Bulletin of Marine Science* 61(2): 241-269.

Musick, J.A. 1999. Criteria to define extinction risk in marine fishes. *Fisheries* 24(12): 6-14.

Parin, N.V. (1992). The Southern boarfish, *Pseudopentaceros richardsoni* (Pentacerotidae), in the Southeastern Pacific Ocean. *Voprosy ikhtiologii* 32 (4): 150-151.

SEAFO SC. 2011. Report of the 7th Annual Meeting of the SEAFO Scientific Committee. South East Atlantic Fisheries Organization. Walvis Bay, Namibia: 62 pp.