



First record of *Sternaspis scutata* (Polychaeta, Sternaspidae) in Egyptian waters

Faiza A. Abdelnaby

National Institute of Oceanography and Fisheries Alexandria, Egypt

Faiza_abdelnaby@yahoo.com

ABSTRACT

ARTICLE INFO

Article History:

Received: March 28, 2010

Accepted: April 6, 2020

Online: April 7, 2020

Keywords:

Annelida

Polychaeta

Sternaspidae

Sternaspis scutata

Port Said

Suez Gulf

The present study deals with the first record of *Sternaspis scutata* (Ranzani, 1817); three specimens were obtained, one was located inside the samples, in 2018, at shallow depths, by trawling net of fishing activity in front of Port Said. The other two specimens were collected from Suez Gulf (Gabal El Zeit region 2017) using benthic samples. The abbreviated description provided with photos, distribution, and habitat also with taxonomic comments. Compared with *S. thalassemoides* Otto, 1821, the first synonyms of *Sternaspis scutata*. For images and detection, stereo zoom microscope (Optika SZM-2 model) and research microscope were used with a digital camera.

INTRODUCTION

In the 19th century, the family Sternaspidae (Ranzani, 1817) was first identified. A member of family Sternaspidae (Ranzani, 1817) contained more than 43 described species of three genera, namely: *Sternaspis*, *Caulleryaspis* and *Petersenaspis* (Méndez and Yáñez-Rivera, 2015; Salazar-Vallejo and Buzhinskaja, 2013 and Kobayashi *et al.*, 2018). The misunderstanding between the anterior end and the posterior end rendered some taxa a misleading synonym, before Krohn (1842) fixed them. They accepted *Sternaspis* as a polychaete (Dahl, 1955). Dales (1962), Fauchald (1977), Pettibone (1982), George and Hartmann-Schröder (1985), and Hartmann-Schröder (1996) treated it as an separate order.

Members of Sternaspidae are commonly referred to as Mud Owls due to their large, rigid, ventral shield that appeared as two large eyes and their round or peanut-shaped body, often distinguished by its distinctive Bright colour, dark yellow to reddish and chitinized ventro-caudal shield (Sendall *et al.*, 2013). That can be used for distinguishing animals in the samples.

Sternaspids are widespread polychaetes. Several new species have been identified as sublittoral, marine, infaunal and non-selective direct deposit feeders from a fairly geographical range (Rouse and Fauchald, 1997; Rouse and Pleijel, 2001; Jumars, *et al.*, 2015; Dales, 1963), abundant in coarse sedimented substrates, soft mud and deep sea clays (Rouse and Pleijel, 2001), they are common in shallow water, sandy bottoms (Sendall *et al.*, 2013), at depths ranging from low intertidal to at least 6489 m (Sendall, 2006; Salazar-Vallejo, 2017). Sternaspids have been observed as vigorous burrowers (Dorgan *et al.* 2006). Feeding and moving are facilitated by introvert part (Méndez and Yáñez-Rivera, 2015).

They are cosmopolitan (Hartman and Reish, 1950), described in the waters around Vietnam (Zhadan *et al.*, 2017), in the South China Sea (Wu *et al.*, 2015; Wu and Xu, 2017), in the tropical-subtropical eastern Pacific (Salazar-Vallejo and Buzhinskaja, 2013; Salazar-Vallejo, 2017) and in the Scotian Sea (Salazar-Vallejo, 2014). Andrade *et al.*, (2015) and Kobayashi *et al.*, (2018) By Molecular Phylogenetics, reported that Sternaspidae is a sister taxon to Fauveliopsidae.

The distribution of the genus *Sternaspis* is worldwide, includes, 13 species they are: *S. thalassemoides*, *S. affinis*, from the Northeastern Pacific, *S. africana* from Western Africa, *S. andamanensis*, *S. costata* from Japan, *S. fossor* from the Northwestern Atlantic, *S. islandica* from Iceland, *S. maior*, *S. princeps* , *S. rietschi* , *S. scutata*.

Regarding history of the Mediterranean Sea record of genus *Sternaspis*, *S. thalassemoides*, Otto, 1821, reported from (Italy. Naples, Tyrrhenian Sea. Naples Bay, Adriatic Sea). The *Sternaspis scutata* in-faunal deposit-feeding polychaete, found non-native in UK. Waters from the Eastern Mediterranean (Townsend *et. al.*, 2006) at depths of 9–36 m. Ben-Eliahu and Fiege (1995) recorded the species in deep water.

The goal of this paper is to document to the Egyptian polychaetes database, the first report of family Sternaspidae and new record species, *Sternaspis scutata*, to increase the diversity of polychaetes in Egypt, by reporting and existing species for the region. Digital photos are provided for description and distribution of the recorded species is given.

MATERIAL AND METHODS

Three specimens were collected, one was found within the samples were collected by trawl net of a fishing working in front of Port Said in 2018, at shallow depths (25m). The other two specimens were found with benthic samples from Suez Gulf (Gabal El Zeit area in 2017) (Fig. 1), using Van Veen grab (0.25m²). specimens preserved in 5% formaldehyde solution, then after sorting fixed in 70% ethanol, in laboratory specimens identified using Stereo zoom microscope (model Optika SZM-2), and research microscope, with digital camera were used for photos.



Figure (1). A map showing the sampling stations.

RESULTS

Phylum Annelida

Order Canalipalata

Class Polychaeta

Genus *Sternaspis* Otto, 1820

Sternaspis scutata (Ranzani, 1817)

Synonymy:

Thalassema scutatus Ranzani, 1817: 1458–1462, Pl. 11, figs 10–13.

Sternaspis scutata Townsend *et al.* 2006: 282–284, figs 1–2; Muthuvelu *et al.*, 2014: 23–25 figs. 2, 3; Sendall and Salazar-Vallejo, 2013: 41, fig. 13 a-i.

Material examined:

Three specimens were collected, one from Port Said in 2018, two specimens from Suez Gulf (Gabal El Zeit area in 2017), sandy bottom.

Description:

Sternaspis scutata is a burrowing worm with a bright texture; a body up to 11-17 mm in length, up to 22 segments, a body divided to the front and the back. Introvert (the body's anterior part), paler than the abdomen (Fig. 2).

The body is finely papillated, more eroded on introvert than on the abdomen; the papillae are more perceptible in smaller specimens. The first seven segments comprising the anterior portion (Introvert) (Fig. 3, 4), head reduced, bearing a small, rounded, hemispherical prostomium above the mouth (Figs. 2, 3). The prostomium often being separated from the rest of the body by a narrower segment, without eyes pots, no antennae, palps or nuchal organ (Figs. 2, 3). Mouth circular, completely covered with minute papillae. Peristomium covered by short papillae. First three chaetigers bearing bundles of 8–10 widely separated slightly falcate hooks or chaetal spines (Fig.3), hooks range in color from bronze in larger specimens to pale gold in smaller specimens.

Genital papillae protrude ventrally from body wall between segments 7 and 8, long and cirriform (Fig.3). On the ventral side of the posterior part of the body there are two chitinised calcareous plates forming a shield (Fig. 4). Pre-shield region with 7 segments, Vento-caudal shield ranging in color from orange and red in small specimens to blue-black. Shield plate divided into two unequal parts by an oblique line and marked with ridges and striae. (Fig.4). Anterior margins truncate, straight; anterior depression deep. Lateral margins straight, not expanded medially. Fan smooth, markedly projecting beyond posterior corners, with margin smooth, hardly crenulated. Marginal shield with chaetal fascicles include 10 laterally chaetae in an oval arrangement; six posterior fascicles for each plate, chaetae in a slightly curved arrangement. Branchiae present, thick and coiled; inter-branchial papillae, long, filamentous (Fig. 5, 6, 7). Introvert hooks and shield show three distinct patterns. Often exhibiting radial ribs, concentric lines or both. *Sternaspis* is restricted to include species with seven abdominal segments, falcate introvert hooks, and stiff shields.

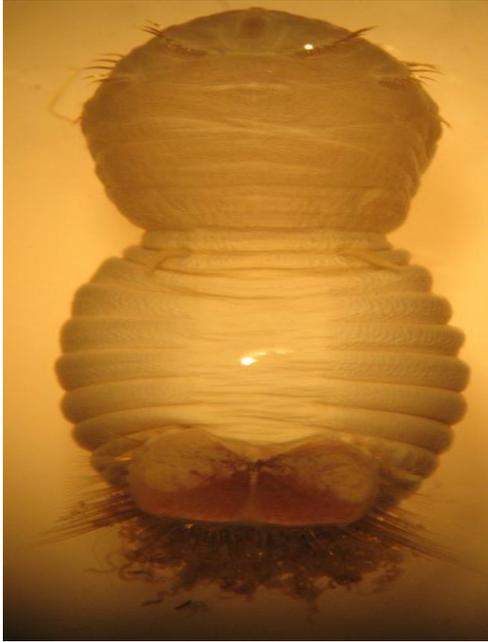


Fig. (2) Complete specimen of *Sternaspis scutata* (Ranzani, 1817) dorsal view, 20mm.

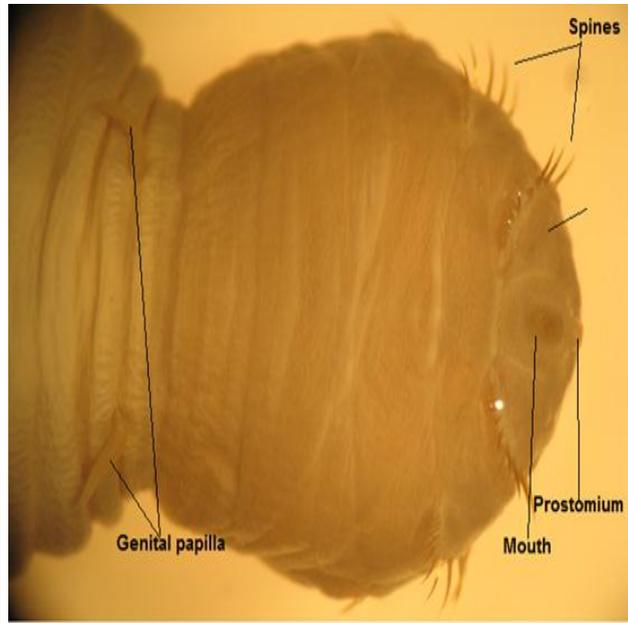


Fig. (3) Anterior part of the body (Introvert) of *Sternaspis scutata*, showing hooks spines, Prostomium, Mouth and Genital papillae 8mm.

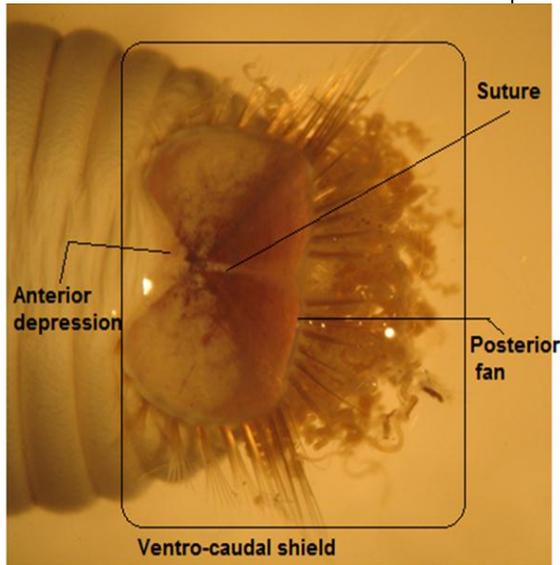


Fig.(4) *Sternaspis scutata*, Posterior part, Ventral-caudal shield in frontal view. Scale bars: 10 mm.

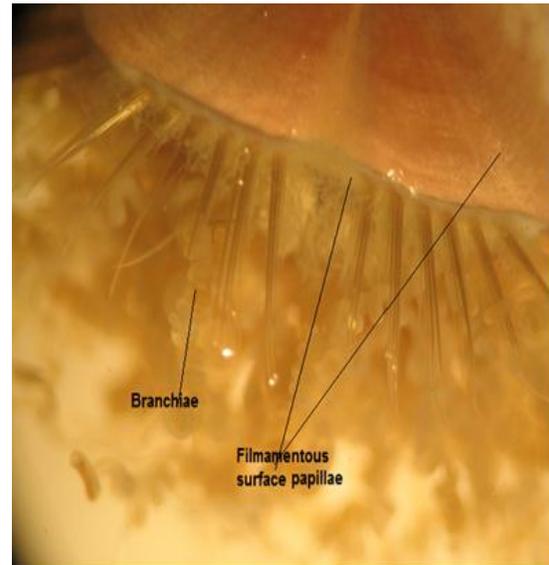


Fig.(5) *Sternaspis scutata* posterior fan, Scale bars: 4mm

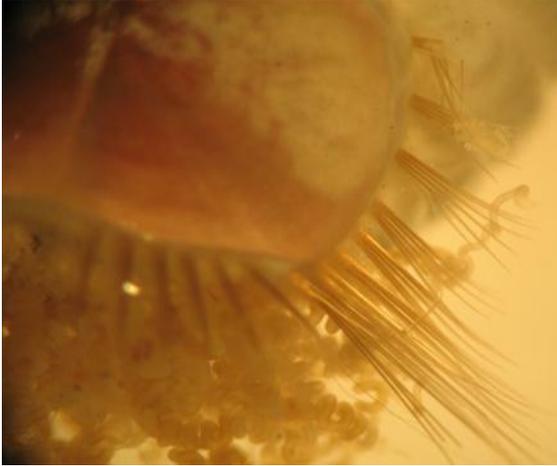


Fig. (7) *Sternaspis scutata*, Left lateral side of Ventro-caudal shield showing bundles of chaetae. Scale bars: 5mm



Fig. (6) *Sternaspis scutata*, Right lateral side of Ventro-caudal shield showing chaetae and brachia. Scale bars: 5mm

REMARKS:

Sternaspis scutata (Ranzani, 1817) appears to be the most common species of genus *Sternaspis*. Researchers have suggested that *S. scutata* is a senior synonym of many species of family Sternaspidae (Hartman, 1959 and Pettibone, 1954).

Sternaspis thalassemoides (Mediterranean species) and *S. scutata* are two morphologically similar species; the former had previously been regarded as a junior synonym of the latter one, until 2013 after the revision of Sendall and Salazar-Vallejo. They were reinstated *S. thalassemoides* as a separated species.

S. scutata differs from *S. thalassemoides* by shield features, especially their fan. Firstly, in *S. scutata* it is markedly expanded behind to the posterior corners, whereas in *S. thalassemoides* it is truncate, crenulated and not expanded behind the posterior corners level, anterior margins rounded, anterior depression deep and lateral margins rounded. Beside, *S. scutata* is unique by the combination of features of their shields than the species of this genus (Sendall and Salazar-Vallejo, 2013).

DISTRIBUTION AND HABITAT:

The type locality of *S. scutata* is Aegean Sea, in the Eastern Mediterranean. Sendall & Salazar-Vallejo (2013), mentioned that this species was restricted to the Mediterranean Sea, but after his revision for the genus, it has been considered questionable. Several other species of *S. scutata* were recorded from non-Mediterranean (Sendall Salazar-Vallejo, 2013); the authors mentioned that they need to be checked morphologically. They have reported that this species is a cosmopolitan; from Arctic and Subarctic waters (Wesenberg-Lund, 1950), Northwestern Pacific (Imajima, 2005), or Northeastern Pacific Ocean (Hartman, 1971), Red Sea (Fauvel, 1957), Indian Ocean (Hartman, 1976),

Southeastern Atlantic (Day, 1967), from the Antarctic Ocean (Hartmann-Schröder, 1986; Gambi and Mariani, 1999).

Sendall & Salazar-Vallejo (2013) and Jose *et. al.* (2014), clarified that *Sternaspis scutata* species are typically marine, except those specimens recorded from India, most species are sub-littoral with few abyssal species, in-faunal, and direct non-selective deposit-feeders. Fauchald (1977) mentioned that Sternaspids occur mostly in sandy and muddy substrate in all depths, but are usually found at depths of 100–200 m, rarely in large numbers, which agrees with the present specimens which collected from sandy bottom. Also, in shallow to great depths (Day, 1967). Ingests mainly fine sediment particles and thus increases the organic content of material in the gut which it feeds. Townsend *et. al.* (2006) mentioned that the species was recorded in muddy sediments along ~125 km of the coastline of SW England. Also Fauchald and Jumars (1979) reported that it is generally found in muddy sand. Joydas and Damodaran (2009), they found *Sternaspis scutata* in the continental shelf region of Arabian Sea (200 m depth), and reported that *Sternaspis scutata* as one of the dominant species. So, it is considered as cosmopolitan polychaete (Kobayashi, *et. al.* 2018).

REFERENCES

- Andrade, S. C.; Novo, M.; Kawauchi, G. Y.; Worsaae, K.; Pleijel, F.; Giribet, M. and Rouse, G. W. (2015). Articulating “archiannelids”: phylogenomics and annelid relationships, with emphasis on meiofaunal taxa. *Mol. Biol. Evol.*, 32(11):2860-2875. <https://doi.org/10.1093/molbev/msv157>.
- Ben-Eliahu, M. N. and Fiege, D. (1995). Polychaeta from the continental shelf and slope of Israel collected by the ‘Meteor’5 Expedition (1987). *Senckenber. Marit.*, 25: 85-105.
- Gambi, C. and Mariani, S. (1999). Polychaetes of the soft bottoms of the Straits of Magellan collected during the Italian oceanographic cruise in February-March 1991. *Sci. Mar.*, 63:233-242
- Dahl, E. (1955). On the morphology and affinities of the annelid genus *Sternaspis*. *Acta Univer. Lund.*, 51(13): 1-22.
- Dales, R. P. (1962). The polychaete stomodeum and the interrelationships of the families of Polychaeta. *Proceed. Zool. Soc., Lond.*, 139: 389–428. doi: 10.1111/j.1469 7998.1962.tb01837.x.
- Dales, R. P. (1963). *Annelids*. Hutchinson univer. Libr., Lond., 200pp

- Day, J.H. (1967). A monograph on the polychaeta of southern Africa. Part II Sedentaria. *Brit. Mus. Nat. Hist. publ. Lond.*, 459–878.
- Dorgan, K. M.; Jumars, P.A.; Johnson, B. D. and Boudreau, B.P. (2006). Macrofaunal burrowing: the medium is the message. *Oceanog. Mar. Biol., Ann. Rev.*, 44: 85-121.
- Fauchald, K. (1977). The polychaete worms: definitions and keys to the orders, families and genera. *Nat. Hist. Mus. Los Angeles County. Sci. Ser.*, 28: 1–190.
- Fauchald, K. and Jumars, P. (1979). The diet of worms: a study of polychaete feeding guilds. *Oceanogr. Mar. Biol. Ann. Rev.*, 17 :193–284.
- Fauvel, P. (1957). Contribution a la faune des annélides polychètes des côtes d’Israel, 2. *Bull. Res. Counc. Isr.*, 6(B): 213–219.
- George, J. D. and Hartmann-Schröder, G. (1985). Polychaetes: British Amphinomida, Spintherida and Eunicida. Keys and notes for the identification of the species. London, EJ Brill, Dr.W. Backhuys.
- Hartman, O. (1959). Catalogue of the polychaetous annelids of the world. Part II. Allan Hancock Foundation Publications Occasional Paper, 28: 355–628.
- Hartman, O. (1971). Abyssal polychaetous annelids from the Mozambique basin off Southeast Africa, with a compendium of abyssal polychaetous annelids from world-wide areas. *J. Fish. Res. Board of Canada*, 28: 1407–1428. doi; 10.1139/f71-219.
- Hartman, O. (1976). Polychaetous annelids of the Indian Ocean including an account of species collected by members of the International Indian Ocean Expeditions, 1963-1964 and a catalogue and bibliography of the species from India. *J. Mar. Biol. Assoc. of India*, 16: 191–252.
- Hartman, O. and Reish, D. J. (1950). The marine annelids of Oregon. Oregon State College Monographs, Studies in Zoology, 6: 1–64.
- Hartmann-Schröder, G. (1986). Die Polychaeten der 56. Reise der “Meteor” zu den South Shetland-Inseln (Antarktis). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, 83: 71–100.
- Hartmann-Schröder, G. (1996). Annelida, Borstenwürmer, Polychaeta. *Die Tierwelt Deutschlands* 58, 2nd ed., Fischer, Jena, 645 pp.
- Imajima, M. (2005). Deep-sea benthic polychaetous annelids from around Nansei Islands. *Nat. Sci. Mus. Monogr.*, Tokyo, 29: 37-99.

- Jose M. P.; Muthuvelu, S. ; Sivaraj, S. and Murugesan, P. (2014). A Note on the Occurrence of *Sternaspis Scutata* (Ranzani 1807) - A Sternaspid Polychaete from Sundarban Mangroves, West Bengal, India. J. Bomb. Nat. Hist. Soc. 111(1):23-25. DOI: 10.17087/bnhs/2014/v111i1/56547.
- Joydas, T.V. and Damodaran, R. (2009). Infaunal macrobenthos along the shelf waters of the west coast of India, Arabian Sea. Indian J. Mar. Sci., 38: 191–204.
- Jumars, P. A.; Dorgan, K. M. and Lindsay, S. M. (2015). Diet of worms emended: an update of polychaete feeding guilds. Annu. Rev. Mar. Sci., 7(1):497–520.
<https://doi.org/10.1146/annurev-marine-010814-020007>
- Kobayashi, G.; Mukai, R.; Alalykina, I.; Miura, T. and Kojima, S. (2018). Phylogeography of benthic invertebrates in deep waters: a case study of *Sternaspis cf. williamsae* (Annelida: Sternaspidae) from the northwestern Pacific Ocean. Deep Sea. Res. Part II Top Stud. Oceanogr., 154:159-166.
<https://doi.org/10.1016/j.dsr2.2017.12.016>.
- Krohn, A.(1842) Uber den Sternaspis thalassemoides, Muller's Archiv fur Anatomie, Physiologie und wissenschaftliche Medicin, 426-432.
- Méndez, N. and Yáñez-Rivera, B. (2015). Distribution and morphometry of the deep-sea sternaspids, *Sternaspis maior*, *Sternaspis uschakovi*, and *Caulleryaspis fauchaldi* (Polychaeta), in Mexican Pacific waters. Bull. Mar. Sci., 91(4):457–467.
<https://doi.org/10.5343/bms.2015.1046>.
- Muthuvelu,S.; Raj, S. and Murugesan, P. (2014). A Note on the occurrence of Sternaspis, west Bengal, India. J. Bomb. Nat. His. Soc., 1(1) 22-2.
- Pettibone, M. H. (1954). Marine polychaete worms from Point Barrow, Alaska, with additional records from the Atlantic and North Pacific. Proceed. U. S. Nat. Mus., 103: 203-356. doi: 10.5479/si.00963801.103-3324.203.
- Pettibone, M. H. (1982). Annelida; in: Synopsis and Classification of Living Organisms. Parker SP (Ed.), McGraw Hill, New York., pp 1-43.
- Rouse, G.W and Fauchald, K. (1997). Cladistics and Polychaetes. Zoolog. Scrip., 26(2):139 – 204. DOI: 10.1111/j.1463-6409.1997.tb00412.x
- Rouse, G.W. and Pleijel, F. (2001). Polychaetes. Oxford University Press, Oxford. Ruiz, G.M., Carlton, J.T., Grosholtz, E.D., Hines, A.H., 1997. Global invasions of marine and estuarine habitats by non-indigenous species: mechanisms, extent, and consequences. Am. Zool., 37, 621–632.

- Ranzani, C. (1817). Descrizione di una nuova specie del genere *Thalassema*. Opuscoli Scientifici, Bologna. 1: 112-116, Plate 4.
- Salazar-Vallejo, S. I. (2014). Three new polar species of *Sternaspis* Otto, 1821 (Polychaeta: Sternaspidae). *Zootaxa*, 3861(4):333–344.
<https://doi.org/10.11646/zootaxa.3861.4.3>
- Salazar-Vallejo, S. I. (2017). Six new tropical sternaspid species (Annelida, Sternaspidae) with keys to identify genera and species. *Zool. Stud.*, 56 (32):1–27.
<https://doi.org/10.6620/ZS.2017.56-32>.
- Salazar-Vallejo, S. I. and Buzhinskaja, G. (2013). Six new deep-water sternaspid species (Annelida, Sternaspidae) from the Pacific Ocean. *ZooKeys*, 348:1–27.
<https://doi.org/10.3897/zookeys.348.5449>
- Sendall, K. (2006). Review and revision of the genus *Sternaspis* (Polychaeta: Sternaspidae) using cladistics on morphological characters. Master of Science Thesis, University of Victoria, Canada, 146 pp.
<http://dspace.library.uvic.ca:8080/handle/1828/2189>.
- Sendall, K. and Salazar-Vallejo, S. I. (2013). Revision of *Sternaspis* Otto, 1821 (Polychaeta, Sternaspidae). *ZooKeys*, 286: 1–74.
- Townsend, M.; Worsford, T. M.; Smith, P.; Martina, L.; McNeill, C.; and Kendall, M. A. (2006). Occurrence of *Sternaspis scutata* (Polychaeta: Sternaspidae) in the English Channel. *Cah. Biol. Mar.*, 47: 281-285
- Wesenberg-Lund, E. (1950). Polychaeta. Danish Ingolf-Expedition, 4(14): 1–92.
- Wu, X.; Salazar-Vallejo, S.I. and Xu, K. (2015). Two new species of *Sternaspis* Otto, 1821 (Polychaeta: Sternaspidae) from China seas. *Zootaxa*, 4052(3):373–382.
<https://doi.org/10.11646/zootaxa.4052.3.7>
- Zhadan, A. E.; Tzetlin, A. B. and Salazar-Vallejo, S. I. (2017). Sternaspidae (Annelida, Sedentaria) from Vietnam with description of three new species and clarification of some morphological features. *Zootaxa*, 4226(1):75–92.
<https://doi.org/10.11646/zootaxa.4226.1.3>