

New records of *Panulirus femoristriga* Von Martens, 1872 (Crustacea Achelata Palinuridae) from Celebes and Seram Islands, Indonesia

Rudi Alek Wahyudin¹, Agus Alim Hakim², Mennofatria Boer², Achmad Farajallah³ & Yusli Wardiatno^{2*}

¹Doctoral Program in Aquatic Resources Management, Department of Aquatic Resources Management, Faculty of Fisheries and Marine Sciences, Bogor Agricultural University, Kampus IPB Dramaga, Bogor 16680, West Java, Indonesia

²Department of Aquatic Resources Management, Faculty of Fisheries and Marine Science, Bogor Agricultural University, Kampus IPB Dramaga, Bogor 16680, West Java, Indonesia

³Department of Biology, Faculty of Mathematic and Natural Sciences, Bogor Agricultural University, Kampus IPB Dramaga, Bogor 16680, West Java, Indonesia

*Corresponding author, email: yusli@ipb.ac.id

ABSTRACT

The spiny lobster, *Panulirus femoristriga* Von Martens, 1872 (Crustacea Achelata Palinuridae), is reported for the first time from Celebes and Seram Islands, Indonesia. Three specimens were captured by hand by local fishermen on coral reefs in June 2016. Its morphological characters, habitat and distribution are reported.

KEY WORDS

Decapoda; first record; lobster; morphology; Sulawesi.

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INTRODUCTION

As in many parts of the world, in Indonesia as well all species of the genus *Panulirus* (White, 1847) (Crustacea Achelata Palinuridae) are a valuable fisheries commodity for both local consumption and export (i.e. commercial lobsters).

The genus *Panulirus* - widely distributed in tropical and subtropical areas - currently has 21 species worldwide, with 18 species in tropical areas; 7 of them were discovered in Indonesia (Holthuis, 1991; Chan 1998, 2010): *P. femoristriga* (Von Martens, 1872), *P. homarus* (Linnaeus, 1758), *P. longipes* (A. Milne Edwards, 1868), *P. penicillatus* (Olivier, 1791), *P. polyphagus* (Herbst, 1793), *P. ornatus* (Fabricius, 1798), and *P. versicolor* (Latreille, 1804). Each species has a different distribution. In Indonesia, *P. femoristriga* has been reported from Ambon and

Papua (Chan & Chu, 1996), but not from Celebes and Seram Islands.

This report of the white-whiskered coral crayfish, *P. femoristriga* (Von Martens, 1872) is the first record from Celebes and Seram Islands, Indonesia.

MATERIAL AND METHODS

In June 2016, local fishermen captured three specimens by hand on coral reefs at 5–10 m depths. Figure 1 shows the locations where the specimens were collected on Celebes Island (Sirenja, Balaesang Tanjung, Balaesang Induk, and Sojol sub-district waters) and Seram Island (Manipa, Kelang, and Buano Island). The lobsters were transported live to the laboratory in sawdust and photographed using an Olympus camera (Tokyo, Japan).

The morphological characters of the lobsters were investigated and they were identified using taxonomic keys and published reports (Chan & Chu, 1996; Chan, 1998; Chan & Ng, 2001). The specimen shown in figure 2 was preserved in 96% alcohol and stored in the Department of Aquatic Resources Management, Bogor Agricultural University, Indonesia.

RESULTS

Systematics

Infraorder ACHELATA Scholtz et Richter, 1995
Family PALINURIDAE Latreille, 1802
Genus *Panulirus* White, 1847

Panulirus femoristriga (Von Martens, 1872)
(Fig. 2)

Panulirus femoristriga von Martens, 1872

Panulirus albiflagellum Chan et Chu, 1996

Panulirus longipes femoristriga (von Martens, 1872)

EXAMINED MATERIALS. 1 female (PFS. No.01) Indonesia; Centre Celebes Province; Sirenja, Balaesang Tanjung, Balaesang Induk, and Sojol subdistrict waters; 0°31'50.2"S 119°36'09.1"E; 17.III.2016; by hand directly. 2 males (PFE. No.01-02) Indonesia; Maluku Province; Mania, Kelang, and Buano Island; 3°01'39.7"S 127°44'09.8"E; 23.VI.2016; by hand directly. 1 female: carapace length 58 mm, total length 224 mm, weight 170 g. 2 males: carapace length 74 and 75 mm, total length 234 and 236 mm, weight 310 and 360 g.

DESCRIPTION. Carapace rounded and spiny; rostrum absent; anterior margin armed with irregular-sized spines; height of frontal horn about 2.5 times the eye height; median area behind frontal horns generally with a longitudinal row of three spines only; cervical groove distinctly wider than posterior marginal groove (Figs. 3, 4). Antennules with flagella longer than peduncle; antennular plate at basis of antennae bearing one pair of well-separated principal spines and some scattered spinules (Fig. 4); ventral surfaces of distal two antennal segments, each with a row of two equal-sized large

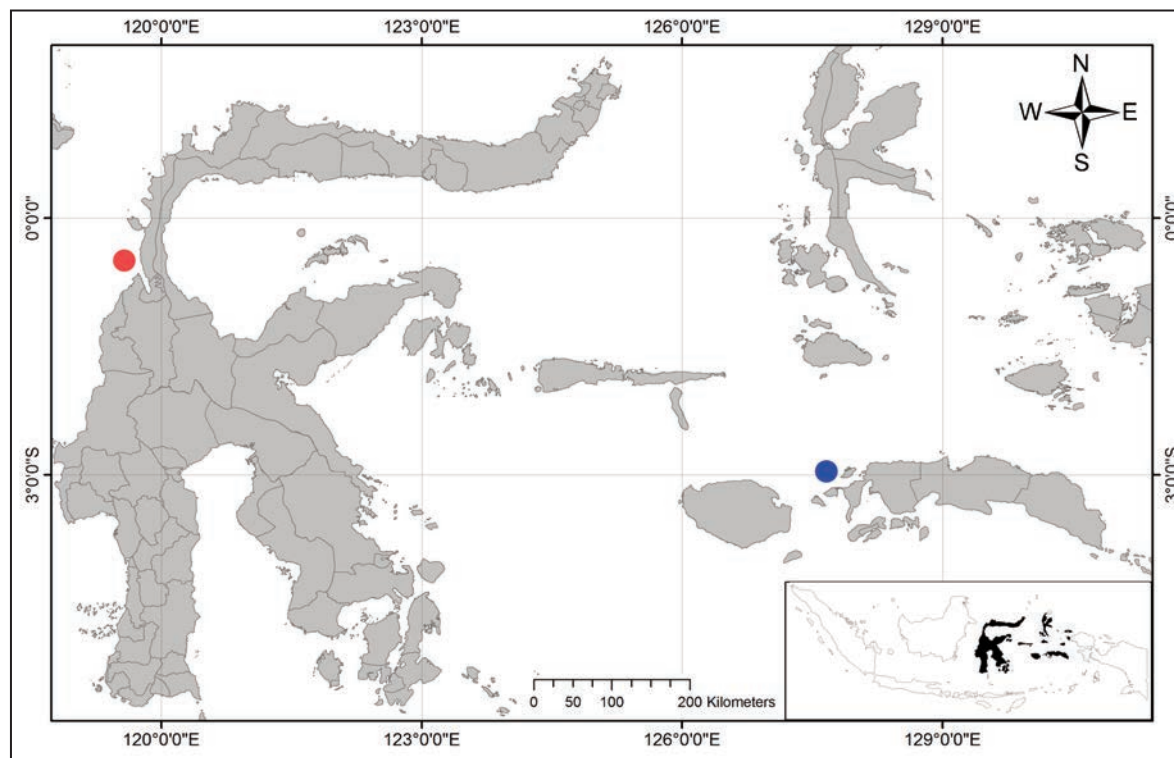


Figure 1. The two locations where *Panulirus femoristriga* specimens were collected on Celebes (red circle) and Seram (blue circle) Islands.

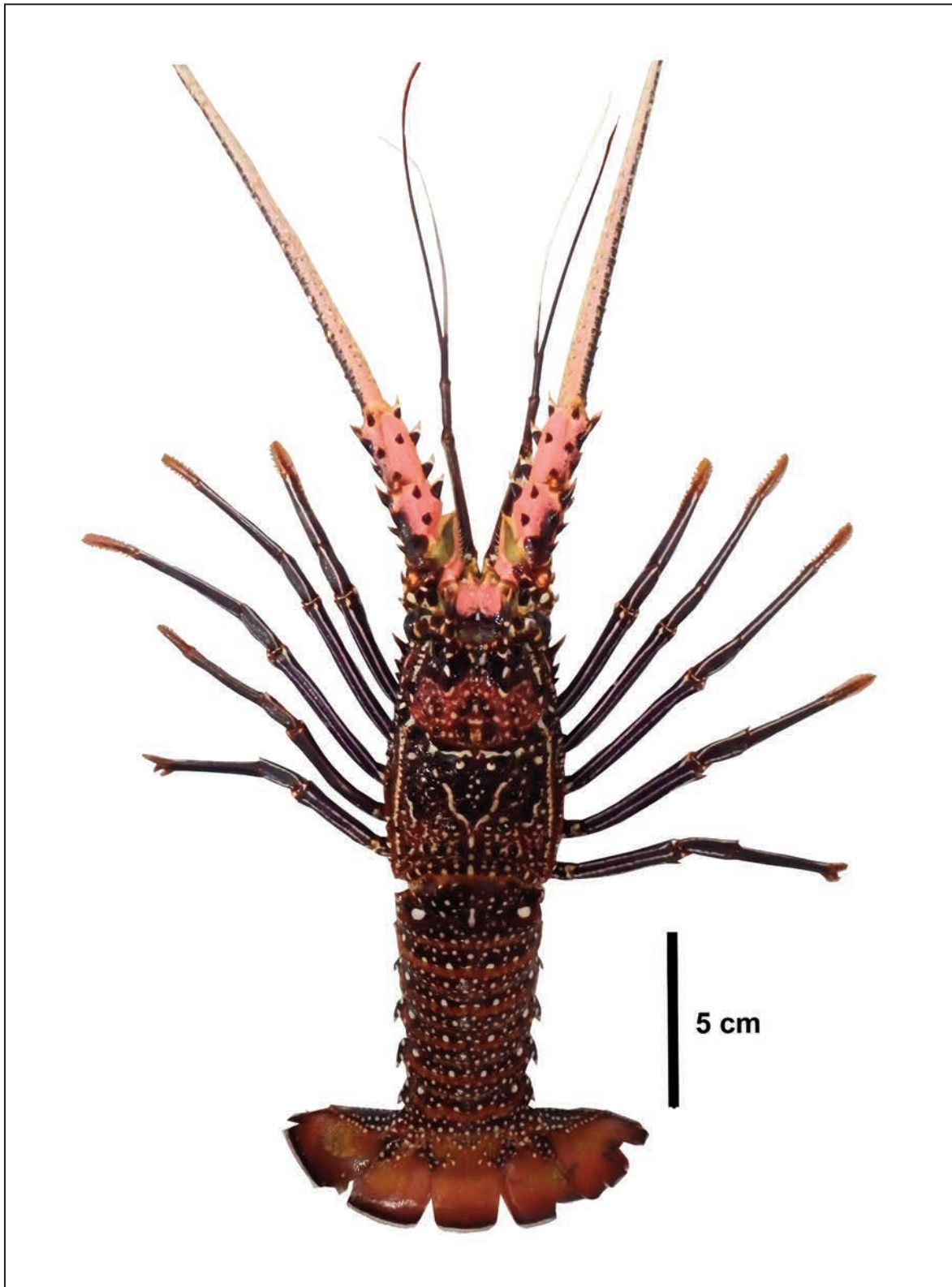


Figure 2. A specimen of *Panulirus femoristriga* collected from Celebes Island, Indonesia (female: CL 58 mm, TL 224 mm).

spines only (Fig. 5). Thoracic sternum with two strong submedian protrusions (Fig. 6). Abdominal segments with a complete transverse groove joining the pleural groove; abdominal pleura only with that of second segment sometimes bearing spinules (Fig. 7).

BIOLOGY. *Panulirus femoristriga* lives in shallow rocky and coral reef areas at depths of about 20 m (Chan & Chu, 1996). On Celebes Island, this species was found on a coral reef at 5–10 m depths, while on Seram Island it was captured at 5–15 m depth on a coral reef.

DISTRIBUTION. This species occurs in the Maldives, Japan, Taiwan, Vietnam, the Philippines, Indonesia (Ambon, Irian Jaya), the Polynesian Islands, Solomon Islands, New Hebrides, Wallis

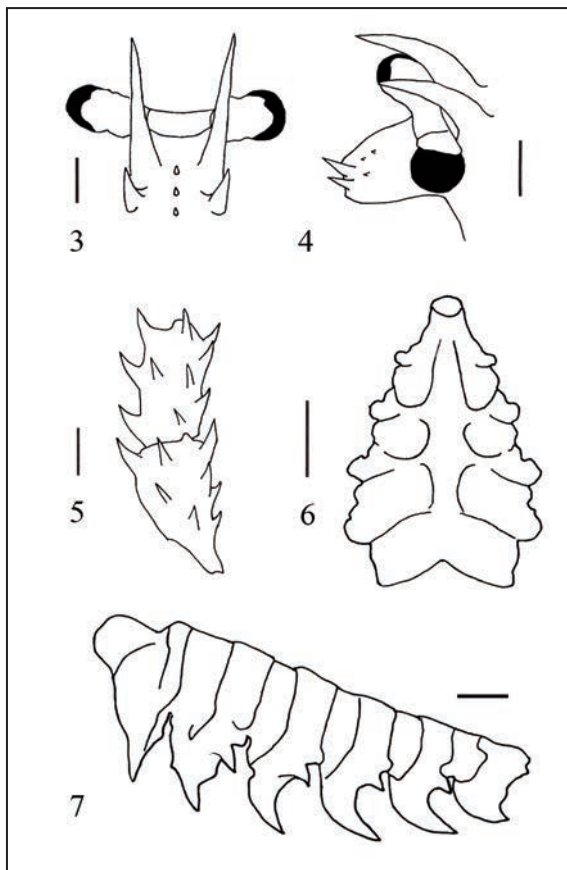
and Futuna, and probably off northern Australia (Chan & Chu, 1996; Ravago & Juinio-Meñez, 2003; Juinio-Meñez & Gotanco, 2004). This paper adds Celebes and Seram Islands, Indonesia, to the range of *P. femoristriga*.

REMARKS. *Panulirus femoristriga* is a lobster with a cryptic form. Von Martens (1872) first described the species. The holotype of this species was sent to the Museum für Naturkunde (Berlin), but it could not be located and has probably been lost (Chan & Ng, 2001). Chan & Chu (1996) described *P. albiflagellum* as new species based on a morphological analysis of the antennular flagella. Chan & Ng (2001) corrected the nomenclature of *P. albiflagellum* and it became a synonym of *P. femoristriga*. The taxonomy of *P. femoristriga* was clarified 15 years ago, and *P. longipes femoristriga* (von Martens, 1872) is also a synonym of *P. femoristriga*.

DISCUSSION

As one of the global hotspots of marine life, Indonesian waters are rich in crustacean species such as hippoid crab, mantis shrimp, mud crab, blue swimming crab, lobster, etc. Recent studies show that diversity and new distribution records of crustaceans in Indonesian waters have been increasing, e.g. hippoid crabs (Mashar et al., 2014; Ardika et al., 2015; Mashar et al., 2015; Wardiatno et al., 2015a,b), palinurid lobsters (Wardiatno et al., 2016a), nephropid lobster (Wardiatno et al., 2016b), and scyllarid lobsters (Wardiatno et al., 2016c). Before 2001, *P. longipes* was believed consisting of two subspecies, i.e. *P. longipes longipes* and *P. longipes femoristriga*. The two subspecies have small to medium-sized white spots plastering the abdomen. The colour pattern of the pereopods make them different: *P. longipes longipes* has spotted legs and *P. longipes femoristriga* has striped legs. Although *P. longipes femoristriga* is now a synonym of *P. femoristriga*, *P. femoristriga* has the same local name as *P. longipes longipes* in Indonesia - the “batik lobster” - because the colour pattern of the abdomen is like the batik pattern of Indonesian traditional clothes. Collectors and vendors are more familiar with the local name of the species.

The occurrence of some Indonesian lobsters from different locations was informed earlier and



Figures 3–7. *Panulirus femoristriga* from Celebes Island (male; CL 58 mm). Fig. 3: anterodorsal carapace; Fig. 4: antennular plate; Fig. 5: antennal peduncle, ventral view; Fig. 6: thoracic sternum; Fig. 7: abdomen, lateral view. Scale bars, 10 mm.

most of them are highly economic fishery commodities, such as *P. penicillatus* (Chow et al., 2011; Kalih, 2012; Abdullah et al., 2014), *Linuparus somniosus* (Wowor, 1999), *P. versicolor* (Ongkers et al., 2014), *P. homarus*, *P. longipes*, *P. ornatus*, *Parribacus antarcticus* (Kalih, 2012), and *Puerulus mesodontus* (Wardiatno et al., 2016a). The current finding enriches the marine biodiversity lists of Indonesian waters. Considering that *P. femoristriga* is target species in fishery industry, it is important to obtain biological information for its sustainable fishery management. To date, information and data on population of *P. femoristriga* in Indonesia is still lacking. Therefore, research on the biological information of the species is warranted.

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REFERENCES

- Abdullah M.F., Alimuddin, Muththalib M., Salama A.J. & Imai H., 2014. Genetic isolation among the North-western, Southwestern and Central-Eastern Indian Ocean populations of the pronghorn spiny lobster *Panulirus penicillatus*. *International Journal of Molecular Sciences*, 15: 9242–9254.
- Ardika P.U., Farajallah A. & Wardiatno Y., 2015. First record of *Hippa adactyla* (Fabricius, 1787) (Crustacea, Anomura, Hippidae) from Indonesian Waters. *Tropical Life Sciences Research*, 26: 105–110.
- Chan T.Y., 1998. Lobster. In: Carpenter K.E. & Niem V.H. (Eds.), *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific. Volume 2. Cephalopods, Crustaceans, Holothurians and Sharks*. Rome: FAO, 687–1396.
- Chan T.Y., 2010. Annotated checklist of the world's marine lobsters (Crustacea: Decapoda: Astacidea, Glypheidea, Achelata, Polychelida). *The Raffles Bulletin of Zoology* 23, 153–181.
- Chan T.Y. & Chu K.H., 1996. On the different forms of *Panulirus longipes femoristriga* (von Martens, 1872) (Crustacea: Decapoda: Palinuridae), with description of a new species. *Journal of Natural History*, 30: 367–387.
- Chan T.Y. & Ng P.K.L., 2001. On the nomenclature of the commercially important spiny lobsters *Panulirus longipes femoristriga* (Von Martens, 1872), *P. bispinosus* Borrdaile, 1899, and *P. albiflagellum* Chan & Chu, 1996 (Decapoda, Palinuridae). *Crustaceana*, 74: 123–127.
- Chow S., Jeffs A., Miyake Y., Konishi K., Okazaki M., Suzuki N., Abdullah M.F., Imai H., Wakabayasi T. & Sakai M., 2011. Genetic isolation between the Western and Eastern Pacific populations of pronghorn spiny lobster *Panulirus penicillatus*. *PLoS ONE*, 6: e29280.
- Holthuis L.B., 1991. *FAO species catalogue. Marine lobsters of the world. An annotated and illustrated catalogue of species of interest to fisheries known to date. Volume 13*. Rome: FAO Fisheries Synopsis 125, 292 pp.
- Juinio-Menez M.A. & Gotanco R.R., 2004. Status of spiny lobster resources of the Philippines. In: Williams K.C. (Ed.), *Spiny lobster ecology and exploitation in the South China Sea region*. Canberra: Australian Centre for International Agricultural Research, 3–6.
- Kalih L.A.T.T.W.S., 2012. Diversity and distribution of Palinurid and Scyllarid lobster in the Lombok Island coastal waters. Thesis. Graduate School, Gadjah Mada University, Yogyakarta.
- Mashar A., Wardiatno Y., Boer M., Butet N.A. & Farajallah A., 2014. The diversity and abundance of sand crabs in south coast of Central Java. *ILMU KELAUTAN: Indonesian Journal of Marine Sciences*, 19: 226–232.
- Mashar A., Wardiatno Y., Boer M., Butet N.A. & Farajallah A. & Ardika P.U., 2015. First record of *Albunea symmysta* (Crustacea: Decapoda: Albuneidae) from Sumatra and Java, Indonesia. *AAFL Bioflux*, 8: 611–615.
- Ongkers O.T.S., Pattiasina B.J., Tetelepta J.M.S., Natan Y. & Pattikawa J.A., 2014. Some biological aspects of painted spiny lobster (*Panulirus versicolor*) in Latuhalat waters, Ambon Island, Indonesia. *Aquaculture, Aquarium, Conservation & Legislation*, 7: 469–474.
- Ravago R.G. & Juinio-Meñez M.A., 2003. Phylogenetic position of the striped-legged forms of *Panulirus longipes* (A. Milne-Edwards, 1868) (Decapoda, Palinuridae) inferred from mitochondrial DNA sequences. *Crustaceana*, 75: 1047–1059.
- Wardiatno Y., Ardika P.U., Farajallah A., Mashar A. & Ismail., 2015a. The mole crab *Hippa marmorata* (Hombron et Jacquinet, 1846) (Crustacea Anomura Hippidae): a first record from Indonesian waters. *Biodiversity Journal*, 6: 517–520.
- Wardiatno Y., Ardika P.U., Farajallah A., Butet N.A., Mashar A., Kamal M.M., Renjaan E.A. & Sarong M.A., 2015b. Biodiversity of Indonesian sand crabs (Crustacea, Anomura, Hippidae) and assessment of

- their phylogenetic relationships. *AACL Bioflux*, 8: 224–235.
- Wardiatno Y., Hakim A.A., Mashar A., Butet N.A., Adrianto L. & Farajallah A., 2016a. First record of *Puerulus mesodontus* Chan, Ma & Chu, 2013 (Crustacea, Decapoda, Achelata, Palinuridae) from south of Java, Indonesia. *Biodiversity Data Journal*, 4: e8069.
- Wardiatno Y., Hakim A.A., Mashar A., Butet N.A., Adrianto L. & Farajallah A., 2016b. On the presence of the Andaman lobster, *Metanephrops andamanicus* (Wood-Mason, 1891) (Crustacea Astacidea Nephropidae) in Palabuhanratu bay (S-Java, Indonesia). *Biodiversity Journal*, 7: 17–20.
- Wardiatno Y., Hakim A.A., Mashar A., Butet N.A. & Adrianto L., 2016c. Two newly recorded species of the lobster Family Scyllaridae (*Thenus indicus* and *Scyllarides haanii*) from South of Java, Indonesia. *Hayati Journal of Biosciences*, 23: 101–105.
- Wowor D., 1999. The spear lobster, *Linuparus somniosus* Berry & George, 1972 (Decapoda, Palinuridae) in Indonesia. *Crustaceana*, 72: 673–684.