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Short communication

FIRST REPORT: EXISTENCE OF ALPHEID SHRIMP (*Alpheus lobidens* De Haan 1849) IN MANGROVE ECOSYSTEM OF KUALA LANGSA, ACEH, INDONESIA

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Abstract

The existence of alpheid shrimp species in Indonesia is not too much found in the latest scientific publications. Alpheid shrimp species can be used as an indicator to assess the quality of the environment in mangrove areas. The discovery of shrimp species from the Alpheid group adds to the list of biodiversity in the mangrove area of Kuala Langsa. Biodiversity of a high number of species in this group of shrimp is usually found in mangrove areas with muddy sand beaches. This is because, this type of shrimp has a habit of living in muddy areas. The living zone of this type of shrimp is almost the same location as the type of crab that is wrapped like the *Scylla serrata* group. Mangrove area kuala langsa although it has mangrove biodiversity that is relatively high. Kuala Langsa mangrove forests are dominated by the Rhizoporaceae group, which is a type of vegetation that is effective as a sediment trap from the direction of the river estuary while holding abrasion from the direction of the sea. In the current year there is also a condition of decrease in the number of large trees. This is caused by the harvest of mangrove wood to produce charcoal for fuel purposes. This condition will slowly make the function of the ecosystem decrease. Where the role of ecosystems provide living niches for aquatic organisms is decreasing. Land clearing of certain areas of the mangrove area for physical infrastructure purposes such as the construction of restaurants, settlements, roads, small aircraft runways, reduces the ability of the region to maintain the function of its ecosystem. The next thing is the ecological pressure for aquatic biota that has living niches in mangrove areas.

Keyword: alpheid shrimp, alpheus, mangrove, ecosystem, kuala langsa, aceh

I. Introduction

There have not been many studies on non-economical shrimp species such as the Alpheidae family in Indonesia. Reports on the existence of the genus Alpheidae in Indonesia were made by Pratiwi, R. *et al* (2013) at around coastal of Pasir Putih Prigi beach and Cengkong beach (Trenggalek, East Java). Before, Pratiwi, R. (2006) was study about disperse and zonation of crustacean in mangrove area in Mahakam Delta, East kalimantan found *Alpheus euphrosyne* in

area of Kaeli (103 ind), Bayor (37 ind), and Beji (4 ind). Also found *Alpheus sp* (not clear in identified) in Kaeli (25 ind) and Bayor (5 ind). Everything is found in a group. In the world, A total of 103 species of alpheid and one ogyridid shrimp are listed as coming from Philippine national waters, of which 55 are new records reported for this paper. From the South China Sea, primarily in the Hong Kong area, a total of 48 species of alpheids are listed, of which 41 are new records, including one new species of the genus Athanas. As 35 of the listed species are shared between the two areas, the total number of species is 116.

Distribution of this spesies can be seen in Fig. 1, here it is seen that there is no representative data that contains the distribution of the location of the existence of shrimp species from the Alpheid group in Indonesia. Therefore, in the future it is necessary to conduct structured and planned research to complete the database on the existence of shrimp species from the Alpheid group, especially in this case *Alpheus lobidens* De Haan, 1849 in Indonesian.

Fig. 1. Distribution of *Alpheus lobidens* De Haan, 1849 in the world from with no information in Indonesian waters (https://www.gbif.org/species/8416593 accessed 21 August 2021)

II. Result

In Indonesia, the existence of shrimp groups of the Alpheid shrimps has not been well documented. Related to the distribution location and types of species in detail up to the level of genus and species. The research team found this type of Alpheid shrimp (Fig. 2) accidentally at a location outside the transect of observation in a shrimp biodiversity study by Faisal, T.M. et all 2019 (Fig. 3).

Allegedly, the species of Alpheid shrimps found was *Alpheus lobidens*. According to previous studies, this sample distinguished with Alpheidae (snapping shrimps) *Alpheus inopinatus* Holthuis and Gottlieb, 1958 (http://www.ciesm.org/atlas/Alpheusinopinatus.php). Sometime misidentification with *Alpheus crassimanus* Heller, 1862 (cf. Balss, 1936) or *Alpheus lobidens* de Haan, 1850 (cf. Banner and Banner, 1981) (note: the taxonomic position of the species is under investigation).

Based on the results of this research, the number of shrimp and prawn families found in the mangrove ecosystem Kuala Langsa (Acehnese) consists of three families, from the Peneaidae, Palaemonidae and the new record is

Alpheidae. Still a big possibilty to find other other families of shrimp or prawn around coastal waters Kuala Langsa. This area known to have a high enough level of mangrove biodiversity despite environmental pressures by human activities is high. The loss of mangrove biodiversity and its coverage will accelerate the biodiversity loss.

Ecologically, the existence of this type of shrimp in nature is almost the same as the type of mangrove crabs, this refers to the existence of the *Alpheus euphrosyne* zone type almost the same as the *Scylla serrata* zone, but it is located just a little to the top. The zone is also below the lowest low tide line and is always under water (Pratiwi, R. *et al* (2013))

Short description of this species (*Alpheus lobidens* De Haan, 1849)

Rostrum triangular, reaching near end of first antennular article. Large chela 2.4 times as long as broad. Superior margin of chela proximal to dactyl with transverse shallow depression, extending on inner palm as shallow triangular depression, on outer palm as quadrangular depression. Inferior margin of chela deeply notched opposite superior groove, notch U-shaped. Small chela sexually dimorphic, male chela balaeniceps. Ischium of third pereopod bearing movable spine. The color of body greenish-brown, faint pale longitudinal stripes on abdomen, chela brownish, fingers of larger chela orange apically violet. With common size Total Length 5.5 cm.

Fig. 2. Alpheid shrimp (*Alpheus lobidens* De Haan, 1849) found in mangrove ecosystem, Kuala Langsa, 2018

Classification of biota according to https://inpn.mnhn.fr/espece/cd_nom/350451/tab/taxo (accessed 21 August 2021) is as follows

Domaine	: Biota
Règne	: Animalia Linnaeus, 1758
Sous-Règne	: Eumetazoa Bütschli, 1910
Clade	: Bilateria Haeckel, 1874
Infra-Règne	: Protostomia Grobben, 1908
Clade	: Cuticulata
Clade	: Ecdysozoa Aguinaldo, Turbeville, Linford, Rivera,

	Garey, Raff & Lake, 1997
Clade	: Panarthropoda Nielsen, 1995
Phylum	: Arthropoda Latreille, 1829
Sous-Phylum	: Crustacea Pennant, 1777
Super-Classe	: Multicrustacea Regier, Shultz, Zwick, Hussey, Ball, Wetzer, Martin & Cunningham, 2010
Classe	: Malacostraca Latreille, 1802
Sous-Classe	: Eumalacostraca Grobben, 1892
Super-Ordre	: Eucarida Calman, 1904
Ordre	: Decapoda Latreille, 1802
Sous-Ordre	: Pleocyemata Burkenroad, 1963
Infra-Ordre	: Caridea Dana, 1852
Super-Famille	: Alpheoidea Rafinesque, 1815
Famille	: Alpheidae Rafinesque, 1815
Genre	: *Alpheus* Fabricius, 1798
Espèce	: *Alpheus lobidens* De Haan, 1849

Synonim name of *Alpheus lobidens* De Haan, 1849 is *Alpheus crassimanus* Heller, 1862 (Espèce CD_NOM = 679730), *Alpheus crassimanus* Heller, 1865 (Espèce CD_NOM = 548872), *Alpheus lobidens polynesica* Banner & Banner, 1975 (Espèce CD_NOM = 679731).

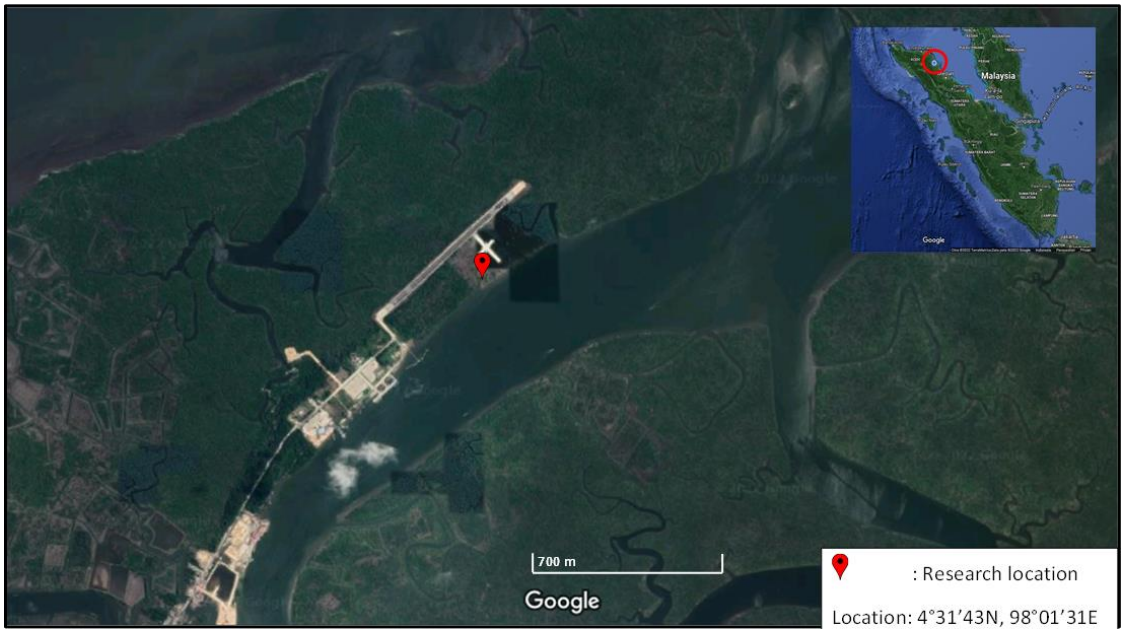

Fig. 3. Coordinate location of Alpheid shrimp (*Alpheus lobidens* De Haan, 1849), found in mangrove ecosystem, Kuala Langsa, 2018

III. Discussion

The genus Alpheus is represented with eight species on the Turkish coasts to date (Bakır *et al.*, 2014): *Alpheus dentipes* Guérin, 1832, *Alpheus edwardsii* (Audouin, 1826), *Alpheus glaber* (Olivi, 1792), *Alpheus inopinatus* Holthuis & Gottlieb, 1958, *Alpheus lobidens* De Haan, 1849, *Alpheus macrocheles* (Hailstone, 1835), *Alpheus migrans* Lewinsohn & Holthuis, 1978 and *Alpheus rapacida* De Man, 1908. *A. edwardsii*, *A. inopinatus*, *A. lobidens*, *A. migrans* and *A. rapacida* are Lessepsian migrants, while the taxonomic status of *A. edwardsii*, *A. inopinatus* and *A. lobidens* is complicated, and the reliable identification of these species is difficult for that reason (Lewinsohn & Galil, 1982).

Characterize those species, the species *A. glaber*, *A. migrans* and *A. rapacida* could also be eliminated, when taking into consideration the structure of the propodus and dactylus of the first pereiopods. The remaining three species, *Alpheus edwardsii*, *A. inopinatus*, and *A. lobidens*, are similar to each other and could easily be confused, according to Lewinsohn & Galil (1982). The present specimen, however, does not belong to *A. edwardsii* as can be deduced from the presence of indentations both on the dorsal and ventral margins of the propodus of the smaller chela (cf. Banner & Banner, 1972).

While thus restricting the identity of the present specimen to either *A. inopinatus* or *A. lobidens*, it should be noted that in the literature various opinions as regards the synonymy of the three similar species have successively been published. Banner & Banner (1972) mentioned *Alpheus audouini* Coutière, 1905 as a junior synonym of *A. edwardsii*, while those authors later on (Banner & Banner, 1975) considered *Alpheus crassimanus* Heller, 1865 and *A. inopinatus* as synonyms of A. lobidens.

More recently Anker (2001), who investigated the colour patterns of some Alpheus species from the Indo-Pacific region, concluded that *A. audouini* and *A. inopinatus* might be valid species. Subsequently Galil *et al.* (2002) noted that the taxonomic position of *A. inopinatus* was under investigation. The most recent, comprehensive work in this respect is that of De Grave & Fransen (2011), who compiled a checklist of all currently known shrimps world-wide, in which they mentioned *A. inopinatus* and *A. lobidens* as valid species, using the above-mentioned publications as references. While doing so, they also indicated *A. audouini* as a junior synonym of *A. edwardsii* and listed *A. crassimanus* as a junior synonym of *A. lobidens*. Considering the paper by De Grave & Fransen (2011) as the most recent holdfast, we may note that Geldiay (1969) reported Alpheus lobidens (as *A. crassimanus*) from the Levantine (=southern) coast of Turkey only, specifically including it in a group of seven species not collected from the Aegean Sea (= western) coast of Turkey and thus distinguishing it from an assemblage of 16 species recorded from those western Turkish waters (see Geldiay, 1969: 5-7, incl. his fig. 1).

Kocata¸s (1981) prepared a list of decapod crustaceans found along the Turkish coasts and mentioned *A. inopinatus* and *A. lobidens* (as *A. crassimanus*) as separate species from the Levantine coast. After that, both *A. lobidens* and *A. inopinatus* were reported from the Turkish coasts by Kocata¸s & Katagan (1994). As regards *Alpheus edwardsii*, the first record of that species from Turkey was based on a personal observation of G. B. Grippa and C. Froglia (in 2002, cited in Galil *et al.*, 2002) from the southwestern coast of Turkey near Fethiye. Subsequently, however, all reports of the occurrence of *A. edwardsii* along the Turkish coasts were given according to that single observation only (Çınar *et al.*, 2005, 2011; Özcan *et al.*, 2008). In view of the above, Bakır *et al.* (2014), in contrast, emphasized that the actual presence of *A. edwardsii* and *A. lobidens* on the coasts of Turkey is questionable.

This was the consequence of the uncertainty as expressed above by those successive authors, that even considering detailed morphology and specific colour patterns can sometimes be inadequate, below a certain taxonomic level, to reliably determine the identity of apparently closely related species. The existence of *A. edwardsii* along the Turkish coasts still remains uncertain and is in need of confirmation (Bakır *et al.*, 2014). As regards *A. lobidens*, however, the present authors have tentatively opted for ascribing the specimen from Izmir Bay to *Alpheus lobidens* De Haan, 1849, rather than to *A. inopinatus*, being well aware of the possible synonymy of the two nominal species as expressed earlier by some authors, but rather taking into account the most recent reports, as cited above. The arguments for this decision are derived from detailed morphology, i.e., the scaphocerite is about 3 times as long as wide, the concavity on the basal part of the outer margin is not as distinct as Holthuis & Gottlieb (1958) described, and the distal part of it, where the tooth is present, is not straight. This occurrence, then, is herein marked as the first record of *A. lobidens* from the Aegean Sea coast of Turkey, awaiting confirmation of the establishment of this species from additional collections in future studies

Distinguishing characteristics

Orbital hoods unarmed, autochthonous species with large grooved chela have spinose orbital hoods. Inner lip of notch on upper surface of chela not overhanging, movable finger of smaller chela in male with fringe of setae. This species is euryhaline, ovigerous females in July - August. Habitat of this species is sand, mud flat, rock and rubble; intertidal to 18 m, once record in 36 m. *Alpheus crassimanus* worldwide in around Indian Ocean, Red Sea to Pakistan. Recorded first from Egypt (Balss, 1936 [1933]). Successively recorded from southern Tunisia (Forest and Guinot, 1956); Israel (Forest and Guinot, 1958; Holthuis and Gottlieb, 1958); southern Turkey (Geldiay, 1969); Syria (Hasan *et al.*, 2008). Establishment success found common along the Israeli coast, mode of

introduction via the Suez Canal (Gruvel, 1936). *Alpheus crassimanus* describe as synonims name from *Alpheus lobidens* De Haan, 1849. This species is categorized as alpheid in the edwardsii group. This type of shrimp has characteristics in general: body not unusually compressed or setose; rostrum acute, triangular, reaching nearly to level of distal margin of 1st antennular segment, dorsal carina rather sharp, not extending posteriorly beyond orbital hoods, base not abruptly delimited from adrostral furrows; carapace without median tooth or tubercle on gastric region, without flattened teeth overhanging posterior ends of adrostral furrows, anterior margin between rostrum and orbital hood unarmed, somewhat incised near rostral margin, adrostral furrows moderately deep; 2nd antennular segment about twice as long as wide; basal antennal segment (basicerite) armed with small ventrolateral tooth not nearly reaching level of tip of stylocerite; antennal scale with lateral margin variably concave, distolateral spine stout, overreaching blade; 1st pereopods with or without distal tooth on inferior flexor margin of merus; major chela somewhat compressed. about 2' times as long as wide, dactyl not noticeably curved in longitudinal plane, not double-ended, having well-developed plunger, palm with longitudinal groove but no carina near margin proximal to fixed finger, with "saddle" proximal to adhesive plaque, shoulder proximal thereto usually rounded, sometimes abrupt, but not overhanging "saddle," shoulder proximal to fixed finger always well developed but varying from rounded to angular; minor chela 3 to times as long as wide, dactyl subequal to palm in length, strongly "balaeniceps" in male only; 2nd pereopod with proximal carpal as long as 2nd; 3rd pereopod with dactyl pointed, simple, propodus usually bearing about 10 spines on flexor margin, carpus not produced distally at propodal articulation, merus unarmed, ischium usually bearing movable spine; maximum carapace length to base of rostrum about 19 mm.

According to Dehghani *et al* 2018 (in Fig. 4A-D) species was found at Kuala Langsa, Aceh identic with Alpheus lobidens De Haan, 1849. Distribution of species Indo-West Pacific: from South Africa to PG, and GO to Japan, Australia and Hawaii. Regional records. PG: Iran (Banner & Banner 1981; Naderloo & Türkay 2012); GO: Iran (Naderloo *et al.* 2015). Habitat. Rocky/cobble intertidal, usually under rocks and large pieces of coral rubble, muddy intertidal, estuaries, mangroves. This species is typically found in the intertidal and shallow subtidal 0–3 m deep. Remark. This species complex is common in PG and GO, especially under rocks and boulders in intertidal habitats. Alpheus lobidens shows several different color patterns and currently is a puzzling group. This species needs a thorough comparison of morphology and observed color pattern variations among individuals, which the authors have started. At least two species are currently distinguishable by the presence or absence of spine on merus of large chela and conspicuous black spots on the abdomen (see Anker & De Grave, 2016)

IV. Conclusion

Existing of alpheid shrimp in Kuala Langsa (as a mangrove ecosystem) shown this area have potentially faunal biodiversity. After this evidence, Kuala Langsa have three family of shrimp and prawn (palaemonidae, peneaidae and alpheidae). For the future we need plan research to continued and crosscheck the existence of alpheid shrimp and may be the other water biota in ecosystem.

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