Occurrence of violet vinegar crab *Episesarma versicolor* Tweedie, 1940 (Crustacea: Decapoda: Brachyura) in mangroves of Pichavaram and Vellar, Tamil Nadu

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Abstract

During the present study on the diversity of brachyuran crabs from the mangroves of Pichavaram and Vellar, five male specimens of a sesarmid crab having stunning blend of violet and white pincers were caught from burrows at the base of mangrove trees. On closer examination, the species was found to be different from the other species which were already recorded. This was identified as *Episesarma versicolor* with the help of taxonomic keys. This happens to be the first report of this species from the mangroves of Tamil Nadu.

Keywords: Mangrove crab, Sesarmidae, *Episesarma versicolor*, Tamil Nadu.

1. Introduction

The union of brachyuran crabs with mangrove flora and their behaviour, feeding and ecology are of great interest to biologists [1]. Brachyuran crabs are the most species-rich faunal groups which exhibit an outstanding diversity in numbers of extant and extinct taxa [2-5]. Over 300 species of crabs have been reported from mangroves worldwide with two families, the Sesarmidae and Ocypodidae accounting for over 80% of the species diversity. In particular, family Sesarmidae attained extreme diversity and richness. Even though they are not important in commercial fishery, their ecological role is significant as they serve as food for the predatory organisms and their faecal matter containing carbon, nitrogen, phosphorus and some trace metals also form a rich food for other consumers in the food web [6]. Crabs are considered as the ‘Keystone species’ of the mangrove swamps because of their vital role in carbon recycling, decomposition of organic matter due to their burrowing habits and degradation of mangrove leaf litter. Because of this, sesarmids play a key role as a major link between primary and secondary producers. In view of the importance of sesarmids, their role in the mangrove ecosystem of Hong Kong was studied in detail [7-9]. In a way, the saying ‘no mangroves, no prawns’ is more applicable to the crabs as well.

Delineating the genus *Episesarma* is quite a challenging task in sesarmidae. Totally there are eight species under this genus at the world level namely *Episesarma chentongense* (Serene and Soh, 1967), *Episesarma mederi* (H. Milne Edwards, 1853), *Episesarma palawanense* (Rathbun, 1914), *Episesarma singaporense* (Tweedie, 1936), *Episesarma versicolor* (Tweedie, 1940), *Episesarma lafondii* (Hombron and Jacquinot, 1846) and *Episesarma crebrestriatum* (Tesch, 1917) [2]. The first five species are among the largest and most common sesarmids in Peninsular Malaysia and Singapore and a simplified key for the identification of these five species based on the coloration of the adult male chelae such as the number of tubercles lying on dorsal margin of the dactylus and the colouration was formulated [10]. However figures depicting the colour pattern have not been included in the key leading to the criticism that interpretation based on colour of chelae causes bias [11].

The fishing of sesarmid crabs especially *Episesarma* spp. for commercial purpose is increasing sharply in the Southeast Asian countries, Australia and China where these are consumed in different ways [12]. Understanding regarding the distribution of a species helps to know its population dispersal [13]. In this context five male specimens of *E. versicolor* (Tweedie, 1940) a Southeast Asian and southern China species belonging to the family sesarmidae, type
locality Singapore was caught in the burrows at the base of mangroves of Pichavaram and Vellar. This species is rare in Indian mangroves. Despite its large size, the crab has not been reported earlier in Tamil Nadu. There is no much information regarding the distribution of this crab from the Indian mangroves and present paper reports the occurrence of *E. versicolor* for the first time from the mangroves of Tamil Nadu.

2. Materials and Methods
During routine survey, five male crab specimens were collected by hand-picking from the burrows and outside the base of mangrove trees in Pichavaram (latitude 11º 25' N; longitude 79º 47' E) and Vellar mangroves [(Parangipettai) (latitude 11º 29'N; longitude 79º 46'E)] Tamil Nadu (Fig. 1). The identification was done based on the presence of number of tubercles on the dorsal margin of dactylus of cheliped [11]. After confirming the identity as *E. versicolor* (Tweedie, 1940) belonging to the family sesarmidae. The specimens were preserved in -20 °C deep freezer for long term storage. The specimens were then deposited in the Museum of Centre of Advanced Study in Marine Biology, Faculty of Marine Sciences, Annamalai University, Parangipettai, Tamilnadu, India (Catalogue No. EV690). Samples were also collected for DNA barcoding.

3. Results
The specimens were identified as *Episesarma versicolor*.

3.1 Systematics
Phylum: Arthropoda  
Sub Phylum: Crustacea  
Class: Malacostraca  
Order: Decapoda  
Family: Sesarmidae  
Genus: Episesarma  
Species: versicolor (Tweedie, 1940)

3.2 Diagnosis
Carapace slightly wider than long; anterolateral region with 2 teeth, first tooth larger in size with sharp angle. Dorsal surface relatively flat, regions well defined, granular and covered with tufts of setae on entire carapace. Dorsal margin of dactylar finger of chela with 40–50 tubercles, forming a stridulatory organ; tubercles increasing in size towards distal end, tubercles not continuous up to tip. Inner surface of male chela with single vertical row of 10–13 distinct granules, cluster of granules on inner surface of proposal finger. Tip of telson oval; abdomen narrow. First gonopod with relatively narrow truncate pectinated tip. Vulvae with flattened operculum, with slight protrusion distally; sternal vulvar cover not obvious. The most characteristic feature is the two tympana on the ventral side. They have a specialized breathing net like arrangement of setae on the pterygostomian region (side of the carapace next to the mouth parts) and water stored among these setae can re-circulate in the gill chamber, keeping the gills moist so that they can breathe atmospheric oxygen to adapt to terrestrial life for some time. The morphometric and meristic characters of the crabs are given in (Table 1).

3.3 Colour
Carapace has an earthen ground colour with deep violet patches. The chelae are stout and have beautiful coloration with outer surface of palm violet at the proximal part, distal part and fingers white. The legs are flat with yellow pointed tips.

3.4 Habitat, biology and fisheries
*E. versicolor* lives in mangroves by digging burrows at the base of trees. Feed on calyx, leaves by gathering these at night from the ground or by climbing up trees as high as 6 m and...
also feeds on water plants. They may also scavenge on dead animals they come across and found to be omnivore/deposit feeders. During high tide in day time, tree-climbing activity is often seen clinging to tree trunks just above the water line. Here they remain motionless. They probably do this to avoid both aquatic predators in water as well as airborne predators such as birds. These crabs are harvested in large numbers for use as food in many Southeast Asian countries.

3.5 Distribution
The original type locality of mangrove crab *E. versicolor* is Singapore. These crabs are distributed widely in mangroves of Southeast Asian countries like Southern China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Thailand, northern Australia and South Asian countries like Bangladesh and Sri Lanka. It has limited distribution in Indian mangroves [14].

Table 1: Morphometric and meristic characters of male *Episesarma versicolor* (n=5).

<table>
<thead>
<tr>
<th>a. Carapace data</th>
<th>Range (in mm)</th>
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<tbody>
<tr>
<td>i. Carapace width</td>
<td>27-37</td>
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<tr>
<td>ii. Carapace length</td>
<td>25-35</td>
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<tr>
<td>iii. Frontal width</td>
<td>13-17</td>
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<tr>
<td>iv. Posterior width of carapace</td>
<td>10-13</td>
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<tr>
<td>v. Abdominal width</td>
<td>9-12</td>
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<tr>
<td>vi. Abdominal length</td>
<td>19-27</td>
</tr>
<tr>
<td>vii. Sternum width</td>
<td>5-7</td>
</tr>
<tr>
<td>viii. No. of anterolateral teeth</td>
<td>2 nos.</td>
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</tbody>
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<tr>
<th>b. Cheliped data</th>
<th>Range (in mm)</th>
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<tbody>
<tr>
<td>i. Propodus length</td>
<td>18-27</td>
</tr>
<tr>
<td>ii. Propodus width</td>
<td>10-16</td>
</tr>
<tr>
<td>iii. Dactyl length</td>
<td>11-20</td>
</tr>
<tr>
<td>iv. Merus length</td>
<td>10-16</td>
</tr>
<tr>
<td>v. No. of tubercles on dorsal margin of dactylus</td>
<td>40-50 nos.</td>
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<tr>
<td>vi. No. of vertical distinct granules of ventral propodus</td>
<td>10-13 nos.</td>
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4. Discussion
The five male specimens from Pichavaram and Vellar mangroves match with the previous descriptions and illustrations of *E. versicolor* by Tweedie (1940) from Singapore mangroves. From the Indian mangroves *E. versicolor* has been recorded only in Coringa (16°-30’ to 17°-00’ N lat. and 82°-14’ to 82°-23’E long) as a primary producer in intertidal mangrove forests [15]. There are chances for the occurrence of this crab in other Indian mangroves too. *E. versicolor* was recorded in Bangladesh mangroves [16]. The feeding ecology of *E. versicolor* was studied in Philippines [17]. The population genetics of *E. versicolor* was also studied all along the Andaman coast of Thailand [18].

*E. versicolor* has a vital role in mangrove ecosystem like carbon recycling, organic decomposition by its burrowing habit. Besides, its fecal matter potentially contributes to secondary production through a coprophagous food chain [19]. In addition to its ecological importance, it has commercial importance as well as an important protein source for people. More or less around 18,000 tons of *E. versicolor* are annually consumed domestically in Thailand [20]. But in some countries like India, Africa America, etc. its significance is not known.

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6. References
12. Macintosh DJ, Ashton EC, Tansakul V. Utilisation and Knowledge of Biodiversity in the Ranong Biosphere


