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Some External Abnormalities Found in Edible Crabs, *Portunus pelagicus* and *P. sanguinolentus*, of Pakistan

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Abstract.- The purpose of this paper is to present information about external abnormalities found in edible crabs *Portunus pelagicus* (Linnaeus, 1758) and *P. sanguinolentus* (Herbst, 1783), which were collected during January 2004 to December 2005 from the coastal waters of Karachi. A total of 3,025 specimens were collected out of which 1,968 were *P. pelagicus* and 1,057 were *P. sanguinolentus*. Out of 1,968 *P. pelagicus*, only 14 crabs (or 0.71%) displayed abnormalities either in carapace, chelipeds, swimming leg, or abdomen. In case of *P. sanguinolentus*, only 3 specimens out of 1,057 (or 0.28 %) were found abnormal morphologically. These abnormalities were associated with carapace and abdomen only.

Key words: *Portunus pelagicus*, *P. sanguinolentus*, external abnormalities, edible crabs, carapace, cheliped

INTRODUCTION

Portunus pelagicus (Linnaeus, 1758) and *P. sanguinolentus* (Herbst, 1783) are edible crabs which are fished by local fishermen for human consumption. These crabs grow to a considerable size and weight and fetch high price in the international market. Since the crab-meat is not popular as a food item in local populace, most of the crabs are exported to other countries. *Portunus pelagicus* and *P. sanguinolentus* are mostly caught as by-catch of bottom set gill-netting and shrimp trawling. These crabs are sold to processors who export the crabs either as frozen crabs or frozen crab-meat.

Naturally occurring morphological abnormalities or deformities in crustaceans are not rare and the most common abnormalities reported in the literature are modifications on carapace (Ahmed and Ahmed, 1966; Tirmizi, 1967; Hugo and Michel, 2005; Gregati and Negreiros-Fransozo, 2009), chelipeds (Shuster Jr. *et al.*, 1963; Nobel, 1964; James, 1968; Ameer-Hamsa, 1973; Zou and Fingerman, 2000; Benetti and Negreiros-Fransozo, 2004), periopods (Nickerson and Grey Jr., 1967), petasma (Sivalingam and Rao, 1968) and the abdomen form (Young, 1933; Mantelatto *et al.*, 2003; Hugo and Michel, 2005; Gregati and Negreiros- Fransozo, 2009). These modifications in external morphology may be attributed to genetic factors (Zou and Fingerman, 2000) or injuries caused by accidents or predation especially during the moulting process (Moncada and Gomez, 1980).

The purpose of this paper is to report external abnormalities observed during an investigation on the biology of edible crabs – *P. pelagicus* and *P. sanguinolentus* – occurring in the coastal waters of Karachi, Pakistan. Most of the abnormalities have not been documented earlier.

MATERIALS AND METHODS

Crabs for the present study were collected from the coastal waters of Karachi during January 2004 to December 2005 by bottom set gill-netting. A total of 3,025 crabs were collected and examined for external abnormalities. Of these, 1,968 crabs were *P. pelagicus*, while 1,057 were *P. sanguinolentus*. Carapace width of the crab was taken, with the help of divider and millimeter scale, from the bases of ninth anterolateral teeth (that is short carapace width – SCW). Photographs were taken with an SLR camera fitted with close-up lenses.

RESULTS AND DISCUSSION

Portunus pelagicus

Out of 1,968 crabs examined, only 14 crabs (or 0.71%) displayed abnormalities either in carapace, chelipeds, swimming leg, or abdomen.

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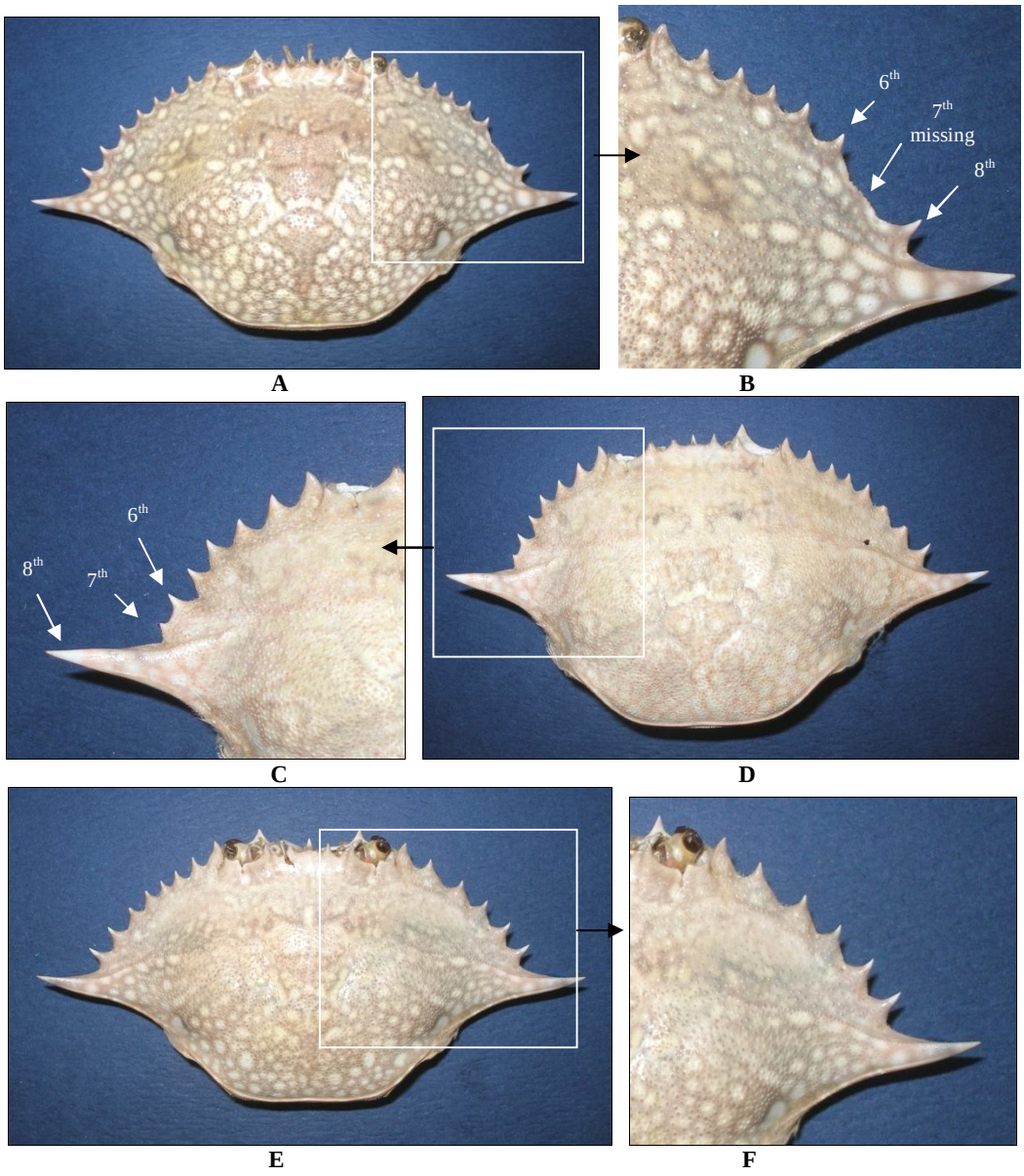

Fig. 1. *Portunus pelagicus*; A-B, only 8 anterolateral teeth (instead of 9) on right side of carapace, 7th tooth is missing. Left side of the carapace has 9 teeth, which is normal; C-D, only 8 anterolateral teeth (instead of 9). The 6th and 7th teeth are unequal while 8th tooth elongated into a long spine. Right side of the carapace has normal teeth; E-F, only 7 anterolateral teeth on right side of carapace; 1st to 6th teeth are semi equal while 7th tooth is elongated (spine). Left side of the carapace has 9 teeth which is normal.

Carapace abnormality

All abnormalities found in carapace were related with the number and shape of the anterolateral teeth. One crab of 88 mm SCW was without 7th anterolateral tooth on the right side of the carapace as shown in Figure 1A,B. However, the left side of the carapace had normal anterolateral teeth (that is 9 in number). Another male crab of 78 mm SCW had only 8 anterolateral teeth on the left side of the carapace, of which 6th and 7th teeth were malformed and the 8th tooth was elongated into a spine (Fig. 1C-D). These abnormalities in carapace

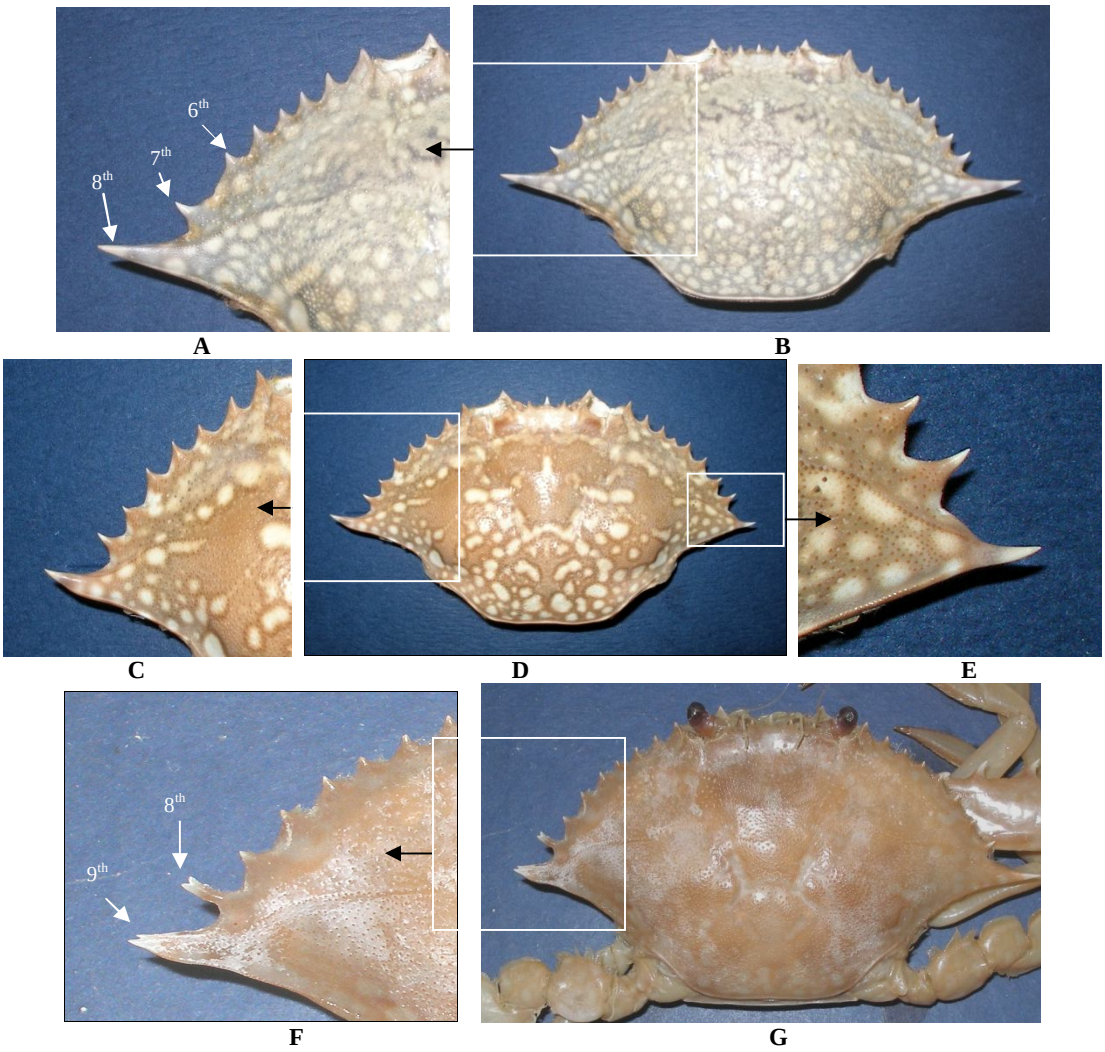

Fig. 2. *Portunus pelagicus*; A-B, only 8 anterolateral teeth found on left side of carapace while the left side has normal 9 teeth; C-E, only 8 anterolateral teeth on left side of carapace while 9th tooth on right side of the carapace is not elongated into spine; F-G, the 8th and 9th anterolateral teeth on left side of carapace are bi-furcated while right side has normal teeth.

teeth/spines may be attributed due to injuries during moulting. Variation in the number of anterolateral teeth was observed in two male crabs of 70 mm and 73 mm SCW. The first one had 7 anterolateral teeth on the right side (Fig. 1E-F) while the other one had 8 anterolateral teeth on the left side (Fig. 2A-B). These 7 and 8 teeth are sub-equal except the last one which forms an elongated spine. There was sign of missing or deformed tooth. In both the specimens, the other half of the carapace had normal anterolateral border cut into 9 anterolateral teeth. This variation in the number of anterolateral teeth does not appear to be caused by injuries but it may be due to some unknown intrinsic factor. A male crab of 96 mm SCW had 8 anterolateral teeth on the left side while 9 anterolateral teeth on the right side. However the last tooth (9th) on the right side was not elongated into spine (Fig. 2C-E).

Four specimens had one or two anterolateral teeth bi-or tri-furcated as shown in Figures 2F and G. A male crab of 104 mm SCW had 8th and 9th anterolateral teeth of the left side of carapace bi-furcated. Another male crab of 89 mm SCW had 9th anterolateral tooth (on the right side of the carapace)

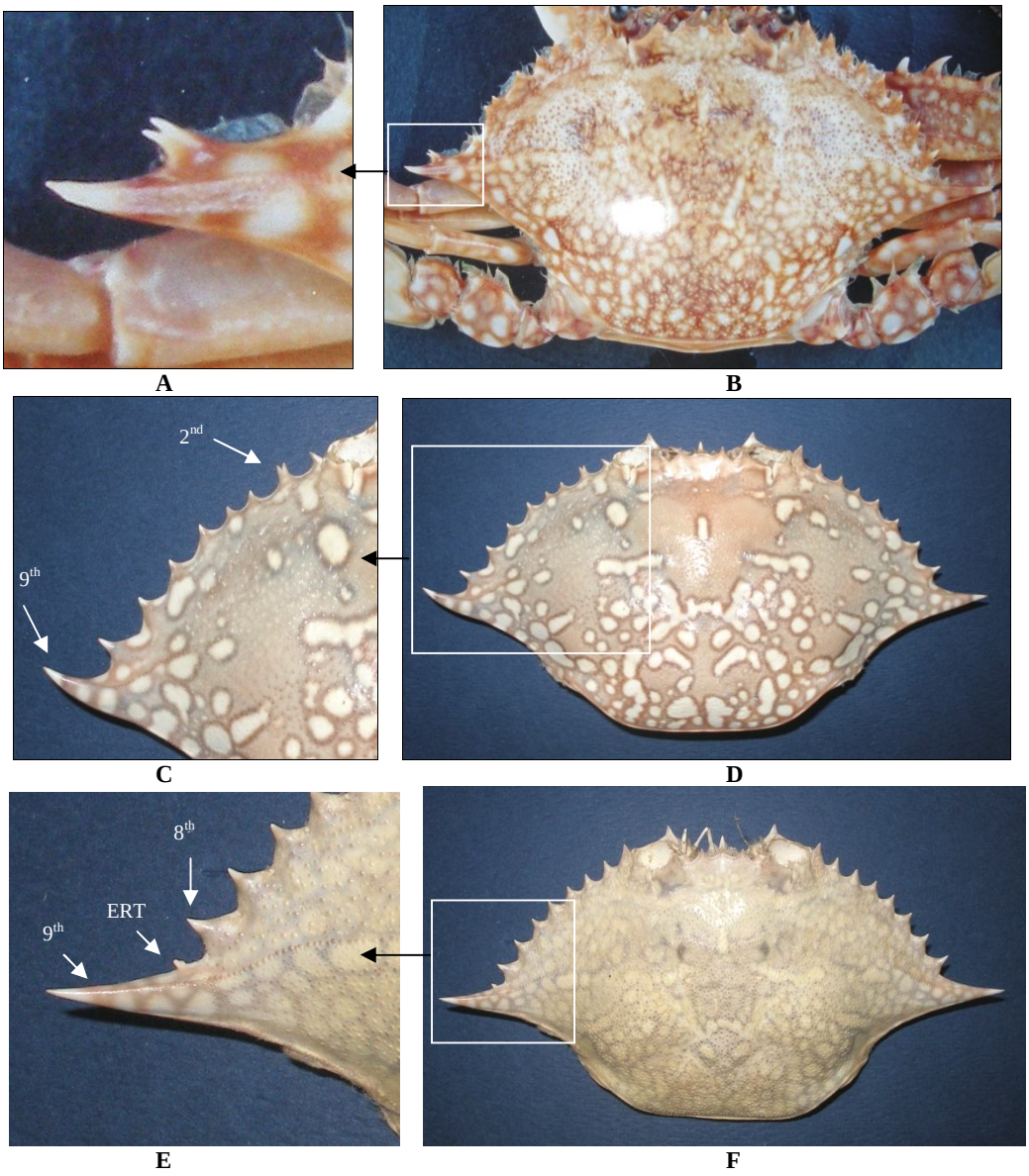

Fig. 3. *Portunus pelagicus*; A-B, 9th anterolateral tooth on left side is tri-furcated; C-D, 2nd tooth bi-furcated and 9th tooth small (not forming an elongated spine) and directed upward. Right side has normal 9th tooth; E-F, an extra rudimentary tooth (ERT) on the base of 9th anterolateral tooth.

armed with an extra tooth which was bi-furcated (Fig. 3 A-B). Second anterolateral tooth was also found bi-furcated in a female crab of 118 mm SCW (Fig. 3C-D). An extra rudimentary tooth was found on the base of 9th anterolateral tooth of left side in a crab of 140 mm SCW (Fig. 3E-F). Another crab of 112 mm SCW had 9th anterolateral tooth on the left side which was not elongated into spine. The right side had elongated 9th anterolateral tooth which also had a rudimentary tooth (or spine) at its distal end (Fig. 4A-C). Figures 4D and E show a carapace of crab (94 mm SCW) in which the anterolateral border of the right side had irregular spines/teeth.

Cheliped abnormality

Only one male crab of 98 mm SCW had right

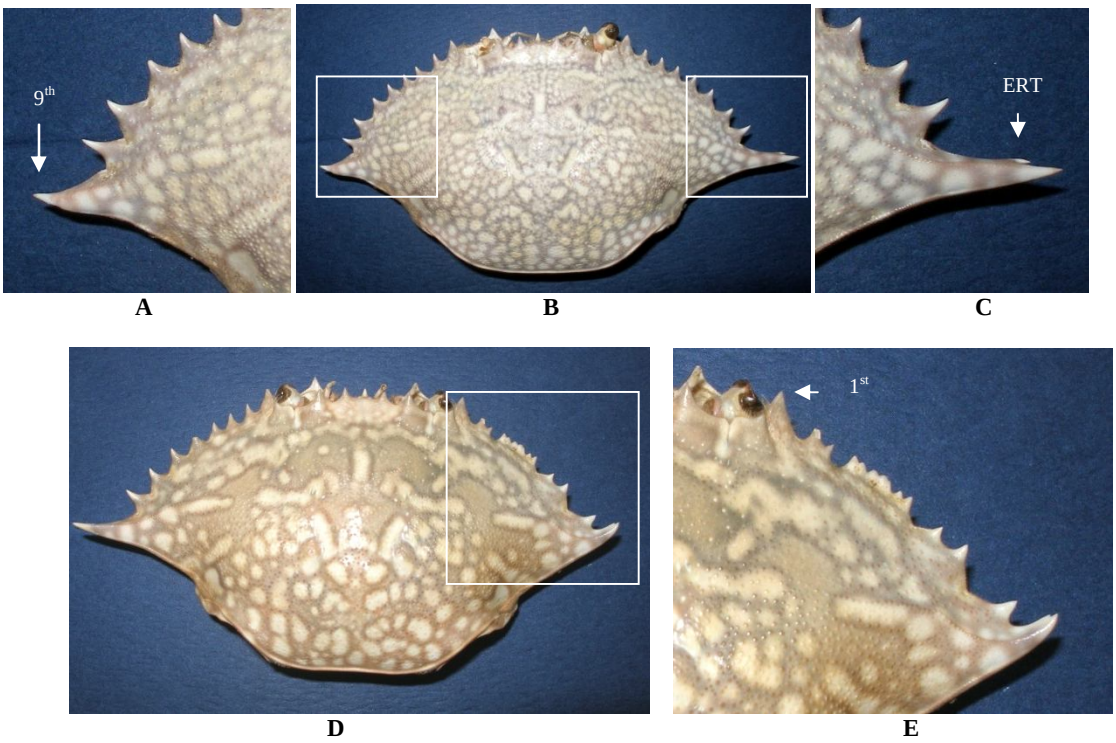

Fig. 4. *Portunus pelagicus*, A-C, 9th tooth on left side of the carapace is not elongated; an extra rudimentary tooth (ERT) on the tip of 9th anterolateral tooth on the right side; D-E, except 1st anterolateral tooth on the right side of carapace, all (2nd to 9th) are modified into many teeth/ spines.

cheliped bent outward as shown in Figures 5A and B. This type of malformity in *P. pelagicus* has earlier been reported from India by Ameer-Hamsa (1973). Other abnormality in cheliped such as presence of two additional dactylii in the left cheliped of *P. pelagicus* has been reported by James (1968) from India. This type of abnormality is attributed to the abnormal wound healing following the damage of the propodus (Nakatani *et al*., 1992). Laboratory studies have shown that this type of phenomenon could be induced in crustaceans (Kao and Chang, 1996; Nakatani and Kitahara, 1999).

Swimming leg abnormality

The fifth walking leg, which is modified into paddle for swimming, was found abnormal in a male crab of 85 mm SCW in which the last two segments, that is propodus and dactylus, of the left swimming leg were deformed as shown in Figures 5C and D. The right swimming leg was normal. It is likely that the cause of deformity is an accident during moulting process.

Abdomen abnormality

An immature female crab of 58 mm SCW had 4th and 5th abdominal segments fused together in the right half of the abdomen while the left half of the abdomen had separate 4th and 5th segment as shown in Figure 5E.

Portunus sanguinolentus

In case of *P. sanguinolentus*, only 3 specimens out of 1,057 (or 0.28 %) were found abnormal morphologically. These abnormalities were associated with carapace and abdomen only. No abnormality was observed in cheliped. Cheliped abnormality in *P. sanguinolentus* (as *Neptunus (Neptunus) sanguinolentus*) from India has earlier been reported by Noble (1964) who found an abnormal specimen having two additional thumbs on the left cheliped.

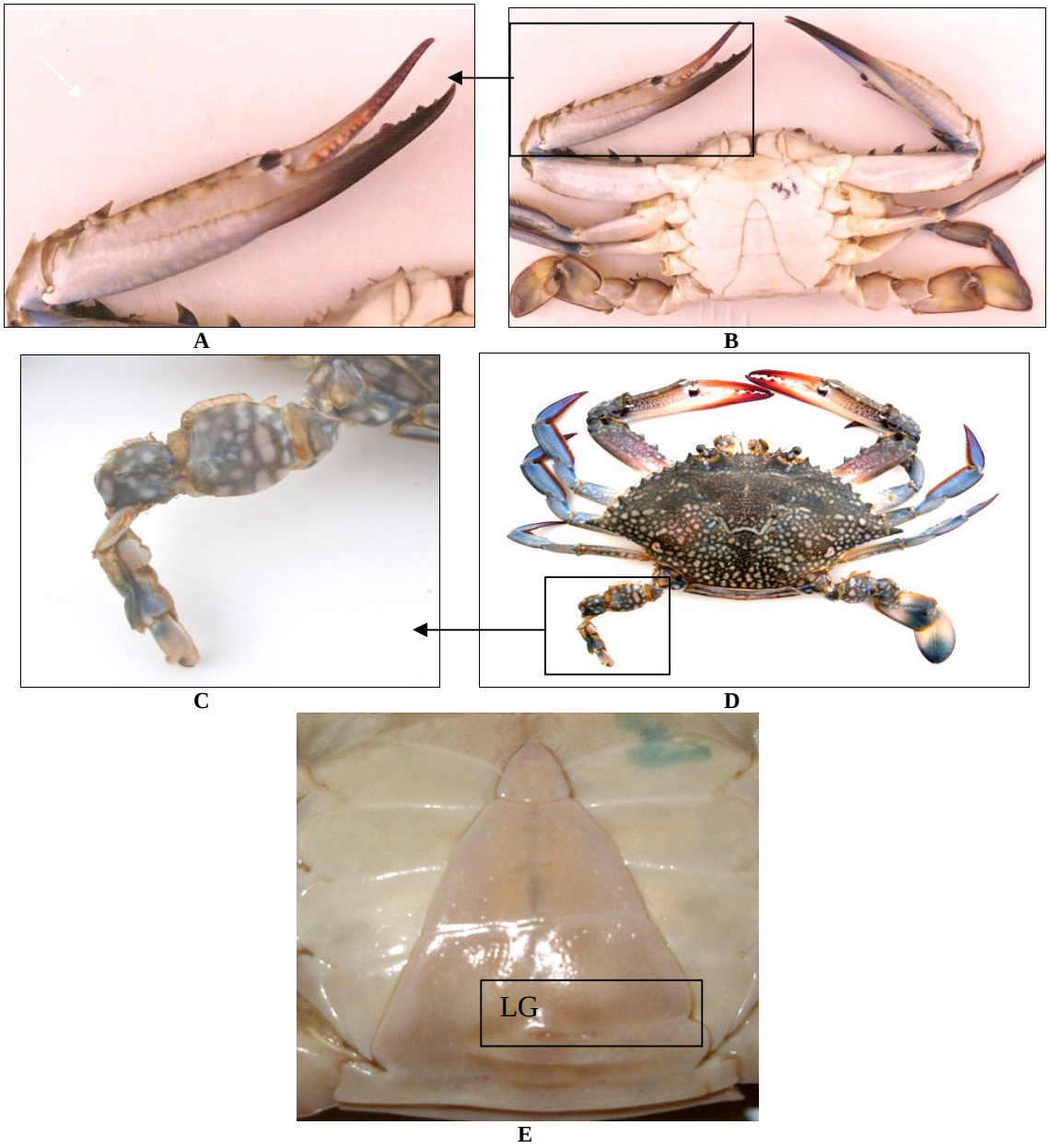

Fig. 5. *Portunus pelagicus*; A-B, right cheliped bent out-wards; C-D, dactylus and propodus of left swimming leg abnormal in structure; E (ventral view): longitudinal groove (LG) between 4th and 5th abdominal segments is present only on the right side.

Carapace abnormality

One male crab of 110 mm SCW had deformed anterolateral teeth on the right side of the carapace (Fig. 6A-B). Fourth anterolateral tooth was malformed while 5th to 8th anterolateral teeth were missing. The 9th anterolateral tooth was also ill-developed. The left side of the carapace was normal. It is highly likely that the deformity was due to injury caused by accident or by predator during moulting process.

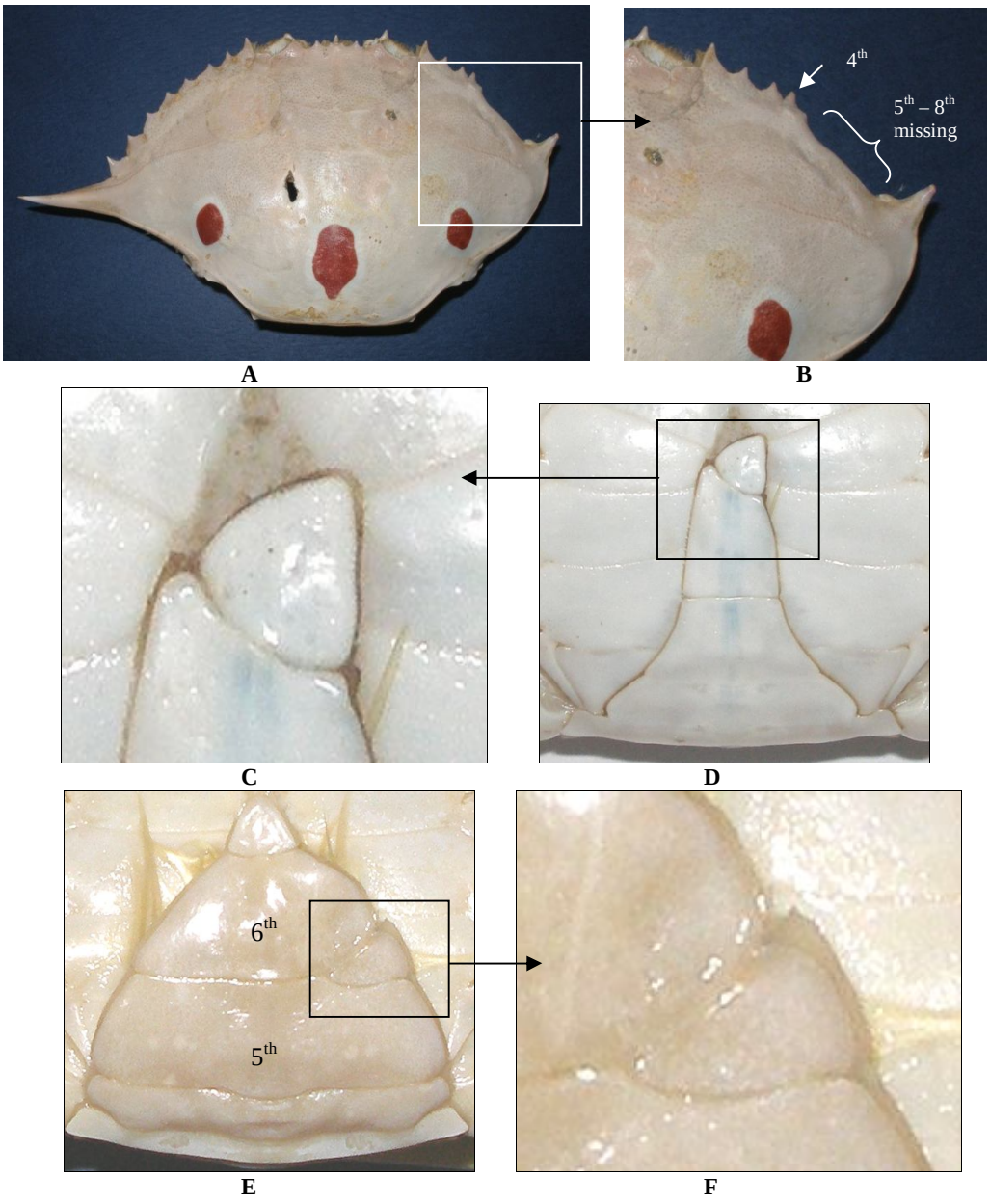

Fig. 6. *Portunus sanguinolentus*; A-B, only 5 teeth on the right side of carapace. Left side is normal, having 9 anterolateral teeth; C-D, abnormality in articulation of 6th segment and telson; E-F, a small and incomplete additional segment present on right side between 5th and 6th abdominal segments.

Abdomen abnormality

Figures 6C to F show the abnormal abdomen in a male and female crab of 98 mm and 102 mm SCW, respectively. In the male crab, the articulation of telson with 6th abdominal segment was not normal while in the female crab an additional incomplete abdominal segment was present. Abnormal abdomen shape and abnormal pleopod of three male crabs, *Callinectes ornatus*, have been reported by Mantelatto *et al*. (2003) from Ubattuba Bay, Brazil.

From Pakistan, morphological abnormalities in portunid crabs have never been reported. The low prevalence of abnormalities observed during present

investigation in *P. pelagicus* and *P. sanguinolentus* may be considered normal and most of them are probably due to abnormal wound healing after injuries caused either by accident or by predators.

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