APPENDIX 2 : FIELD KEYS FOR KENYAN MANGROVE CRABS

Cannicci, S., F. Dahdouh-Guebas & L. Montemagno, 1997. **Field keys for Kenyan Mangrove Crabs.** Museo Zoologico "La Specola" of the University of Florence, Firenze, Italy.

FIELD KEYS FOR KENYAN MANGROVE CRABS

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INTRODUCTION

These keys are intended to be mainly used in field, by non-specialists. For this reason characters have not been used if only visible under microscope (such as the reproductive apparatus details). We also will reduce the morphological terminology to a minimum (see Figs. 1 and 2).

The keys apply to Kenya but can easily be applied to any mangrove crabs from central Somalia to Tanzania. More species are known from Madagascar, southern Mozambique and Natal where, on the other hand, some of the northern species are missing. We hope soon to be able to produce a keyword for the whole East Africa.

We only have considered the species which have been found in mangroves as constant inhabitants (such as *Sesarma guttatum*) or anyway as frequent "intruders" (es. : *Grapsus fourmanoiri*). It is quite possible that other "intruders" may occasionally be found, coming from adjacent biotopes (intertidal mud flats, rocky flats, sheltered cliffs, etc.) which will obviously not fit within these keys. Please remember that, in no cases keys will be able to substitute the specialist's experience and professional literature.

Here are quoted the main sources used for preparing these keys :

Crane, J., 1975. Fiddler crabs of the world. Princeton, N. J.; Princeton University Press.

Crosnier, A., 1965. Crustacés Dècapodes. Grapsidae et Ocypodidae. Faune Madagascar 18: 1-143.

Hartnoll R. G., 1975. Grapsidae and Ocypodidae (Decapoda: Brachyura) of Tanzania. Journal of Zoology 177: 305-328

Macnae W., 1968. A general account of the fauna and flora of the mangrove swamps and forest in the Indo-West Pacific region. Advances in marine Biology 6: 73-270

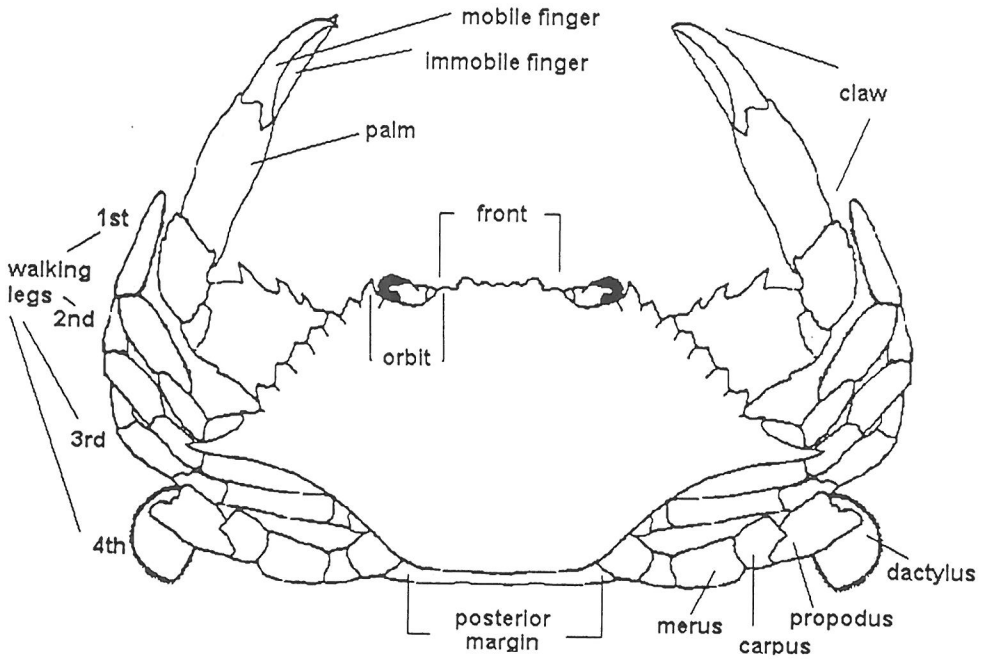
Sakai T., 1976. Crabs of Japan and the adjacent seas. Kodansha Ltd., Japan

Vannini M. & Valmori P., 1981. Researches on the coast of Somalia. The shore and the dune of Sar Uanle. 30. Grapsidae (Decapoda Brachyura). Monitore Zoologico Italiano NS (Supplemento) 14: 57-101

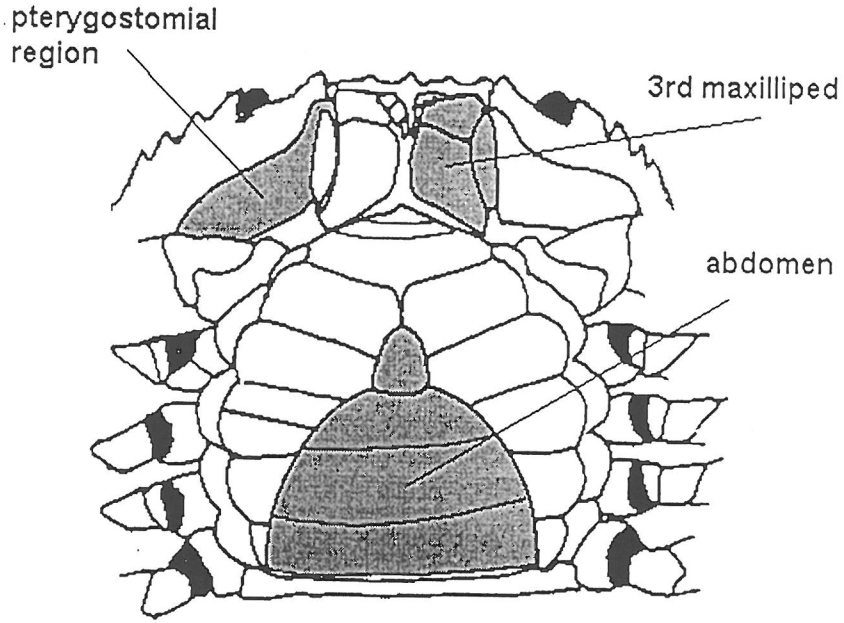
Vannini M. & Valmori P., 1981. Researches on the coast of Somalia. The shore and the dune of Sar Uanle. 30. Ocypodidae and Gecarcinidae (Decapoda Brachyura). Monitore Zoologico Italiano NS (Supplemento) 14: 199-226

Terminology :

Crabs, being Decapods, have 10 visible (5 pairs) thoracic appendix (pereiopods or pereopods). The first pair are called chelae, claw or hands. The following 4 pairs can be called walking legs . The 1st, 2nd, 3rd and 4th walking legs correspond thus to the 2nd, 3rd, 4th and 5th pereiopods. In the following text will we use the terms claw and 1st - 4th walking legs. The claw has two fingers : an immobile (the expansion of propodus) and a mobile one (dactylus). Here, they will always be called mobile and immobile finger.



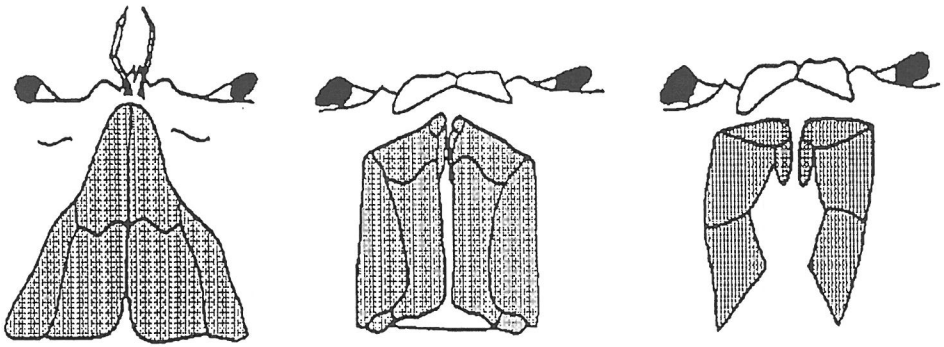
semi-schematic representation of a swimming crab (upper view)



semi-schematic representation of a swimming crab (lower face)

KEYS

1) - buccal frame triangular ..... (fig. 1a) .... (Calappidae) 2
2) - walking legs all largely flattened, carapace with two prominent lateral spines ..... *Matuta lunaris*
- walking legs not flattened, slender, carapace box-like, claws crested ..... *Calappa haepatica*
- buccal frame rectangular ..... (fig. 1b, 1c) 3

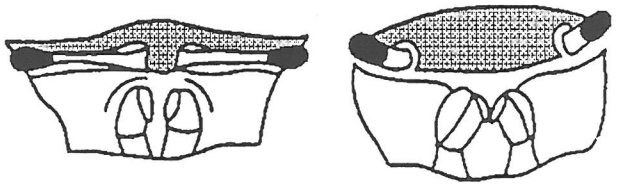


1a) Matuta lunaris 1b) Portunus pelagicus 1c) Metopograpsus oceanicus

3) - last pair of walking legs paddle-like, much more flattened than the other legs..... (Portunidae) 4
- last pair of walking legs never like above 6
4) - carapace with 5 antero-lateral teethes, claws subequal, medium size species ..... (fig. 2a) .....*Thalamita crenata*
- 9 antero-lateral teeth, large species 5
5) - antero-lateral teethes subequal, claws stout and massive, one moderately larger than the other ..... (fig. 2b) ..... *Scylla serrata*
- the ninth antero-lateral tooth about three times longer than the others, claws long, slender and subequal ..... (fig. 2c) ..... *Portunus pelagicus*

2a) Thalamita crenata 2b) Scylla serrata 2c) Portunus pelagicus

6) - front much narrower than orbit ..... (fig. 3a) ..... (Ocypodidae) 7
- front not narrower than orbit ..... (fig. 3b) 20



3a) Uca sp. *3b) Neosarmatium meinerti*

7) - carapace evidently globose, corrugated, buccal frame very large, nearly of the same size of the carapace itself, small species..... *Dotilla fenestrata*
- carapace not globose, buccal frame normal size..... 8
8) - well visible hair tufts bordering a cavity between the base of 3rd and 4th walking legs 9
- any special structure nor hair at the base of the 3rd-4th walking legs ..... (Genus *Macrophthalmus*) 15
9) - carapace squarish, adult eyestalks ending with a styliform process ..... *Ocypode ceratophthalmus*

5f) external face *Uca annulipes* major claw internal face

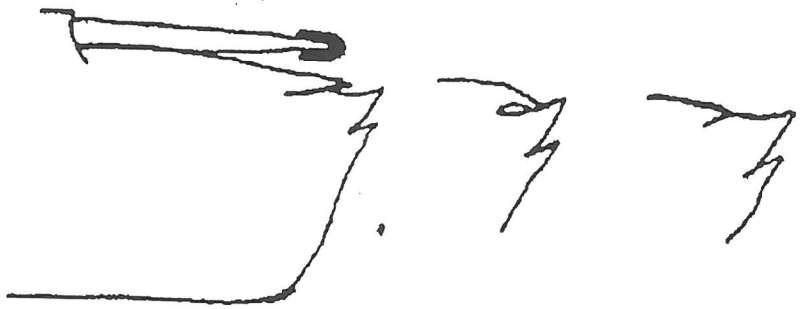
15) - eyestalks largely exceeding the length of the carapace 16
- eyestalks never exceed the carapace 17

16) - eyestalk exceeding the orbit for about
1/4 of the orbit length ..... *Macrophthalmus milloti*
- eyestalk exceeding the orbit for about
the whole orbit length ..... *Macrophthalmus verreauxi*

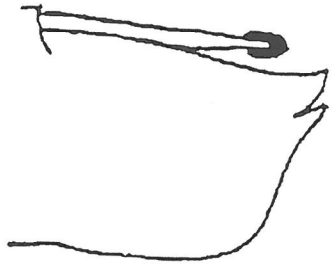
17) - carapace obviously much wider than long
(width/length ratio =>* 1.5)..... 18
- carapace squarish (width/length ratio about 1.2) .. *Macrophthalmus boscii*

18) - carapace nearly twice as wide as long
(width/length ratio about >=2) 19
- carapace width/length ratio about 1.5, orange patches
on the pterigostomial region ..... *Macrophthalmus depressus*

19) -, antero-lateral carapace angle with two notches, inner face of
male propodus with a tooth .....(fig. 6a,b,c) .. *Macrophthalmus grandidieri*
carapace angle with a single notch, inner face of male
propodus without a toot..... (fig. 6d) .. *Macrophthalmus parvimanus*



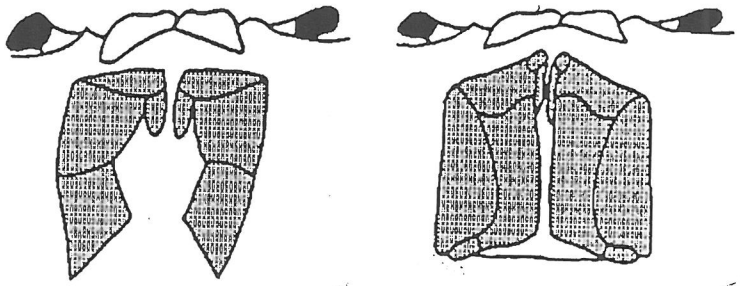
6a,b,c) Macrophthalmus grandidieri



6d) Macrophthalmus parvimanus

20) - brown, smooth, rounded ("inflated-like") carapace,
black hair on walking legs carpus and propodus,
terrestrial, large species, 3rd maxillipeds not meeting
in the middle line ..... (Gecarcinidae) ..... *Cardisoma carnifex*
- carapace not so 21

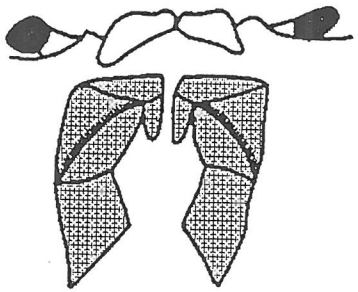
21) - carapace squarish, in certain cases slightly converging
backwards *(Metopograpsus* spp., *Sesarma leptosoma*), 3rd maxillipeds not
meeting in the middle line ..... (fig. 7a) ..... (Grapsidae) 22
- antero-lateral margins and front aligned on
a continuous arch, 3rd maxillipeds meeting
in the middle line ..... (fig. 7b) ..... (Xanthoidea) 44



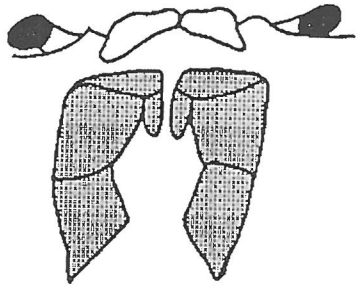
7a) Metopograpsus tuhukar *7b) Portunus pelagicus*

22) - 3rd maxilliped merus with a hairy crest, pterigostomial regions
covered with a reticulated pattern ..... (fig. 8a) ..... (Sesarminae) 24
- 3rd maxilliped merus without crest, pterigostomial regions

smooth or irregularly haired .. (fig. 8b) 23

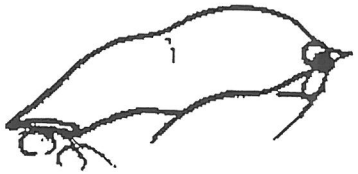


8a) Neosarmatium meinerti



8b) Metopograpsus oceanicus

23) - front strongly bent downwards (fig. 9a)..... (Grapsinae) 36
- front continuing the carapace convexity ..... (fig. 9b) ..... (Varuninae) 40



9b) Varuna litterata

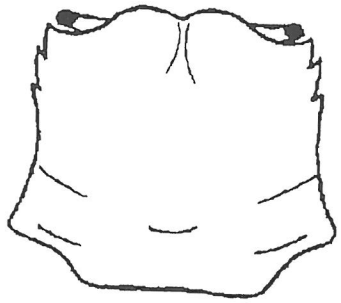
9a) Metopograpsus oceanicus

24) - front not abruptly bent ..... (fig. 10a) 25
- front abruptly bent (90° or more) ..... (fig. 10b) 26

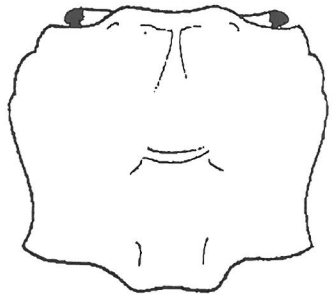
10a) Sarmatium crassum

10b) Neosarmatium meinerti

25) - front rounded, inner orbital angles smoothed, carapace smooth, thick and convex, two teeth behind the antero-lateral one. (fig. 11a) ..... *Helice leachi*
- front squared, inner orbital angles prominent ..... (fig. 11b) ..... *Sarmatium crassum*



11a) Helice leachi



11b) Sarmatium crassum

26) - no teeth behind the antero-lateral one 27
- one or more teeth behind the antero-lateral one 31

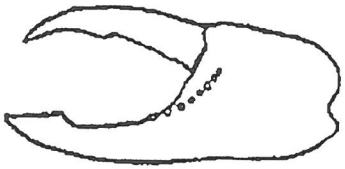
27) - carapace evidently longer than wide, tufts of hair in the anterior region, legs flattened ..... *Selatium elongatum*
- carapace squarish or wider than long 28

28) - carapace fully covered by short tufts of hair, small species ..... *Sesarma villosum*
- carapace almost glabrous 29

29) - walking leg propodus 3 times longer than dactylus, carapace smooth, evidently converging backwards ..... *Sesarma leptosoma*
- walking leg propodus of about the same length as dactylus, carapace feebly converging backwards 30

30) - orange claws ; tubercles on the upper margin of claw mobile finger, uniform ..... (fig. 12a) ..... *Sesarma ortmanni*
- pale-purple claws, tubercles on the upper margin of claw mobile finger not uniform ..... (fig. 12b) ..... *Sesarma eulimene*

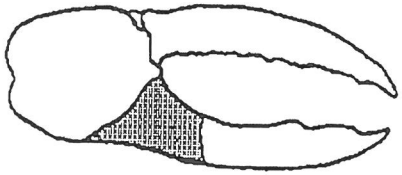
10) - no diagonal ridge on the palm (internal face)
of the major claw ..... (fig. 4a) 11
- an evident ridge of tubercles on the palm
of the major claw ..... (fig. 4b) 12

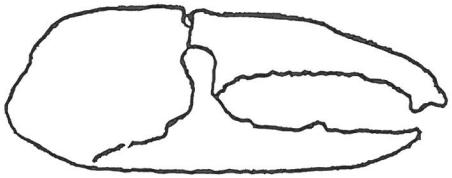


major claw internal face

4a) Uca inversa *4b) Uca urvillei*

11) - major claw pale, an orange patch restricted at
the base of immobile finger ..... (fig. 5a) ..... *Uca tetragonon*
- major claw uniformly pinkish or yellow-pink, tip of
mobile finger with an evident subterminal tooth ... (fig. 5b) ..... *Uca inversa*



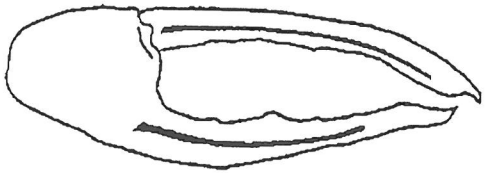


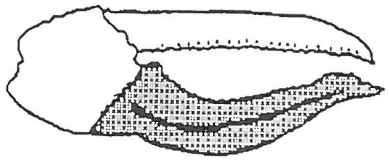
5a) Uca tetragonon *5b) Uca inversa*

12) - large species, a long groove on the external face
of both fingers of the major claw ..... (fig. 5c) ..... *Uca urvillei*
- medium or small species with no
groove on the mobile finger 13

13) - medium species, immobile finger orange, noticeably flattened, sabre-like,
with a long groove on its external face .. (fig. 5d) ... *Uca vocans hesperiae*

major claw external face

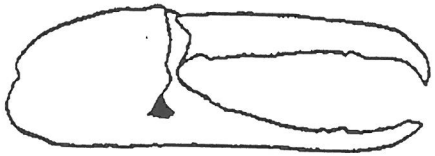


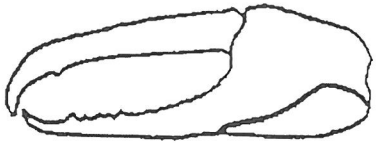


5c) Uca urvillei *5d) Uca vocans hesperiae*

- small species, immobile finger slender and never orange,
a thin grove on the lower external face of major claw immobile
finger only in *Uca annulipes*..... 14

14) - a roughly triangular depression on external base of the
immobile finger , internal crest rounded ; cross section
of both fingers, round ..... (fig. 5e) ..... *Uca chlorophthalmus*



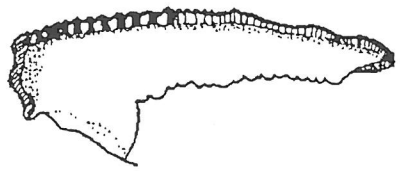


5e) **external face** ***Uca chlorophthalmus*** **major claw** **internal face**

- no triangular depression, palm crest triangular, major
claw uniformly pink (from pale to reddish pink);
a vertical groove bordering a ridge on the claw outer face,
near the mobile finger; cross section of both fingers,
flattened ..... (fig. 5f) ..... *Uca annulipes*

mobile finger

12a) Sesarma ortmanni



12b) Sesarma eulimene

31) - one tooth behind the antero-lateral one (with a possible small accessory notch) 32
- two evident teeth behind the antero-lateral one 34

32) - row of tubercles on the inner palm 33
- no row of tubercles on the inner palm, medium species, claws dark purple-red with red mobile finger tips, internal palm bright-orange ..... *Sesarma guttatum*

33) - large species, carapace squarish, claws with red carpus and base of propodus; mobile finger and internal palm, pale yellow ..... *Neosarmatium meinerti*
- medium species, carapace diverging backwards, traces of a third teeth behind the second one ..... *Sesarma impressum*

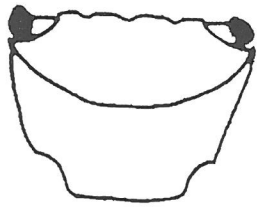
34) - massive species (carapace length/thickness about 1.3) a spine on the claw mobile finger ..... *Neosarmatium smithi*
- carapace regularly flattened (length/thickness about 1.7), no spines on the mobile finger 35

35) - carapace squarish, mottled, legs flattened, walking legs tips very short (propodus/dactylus ratio, 1.5)..... *Selatium brocki*
- carapace diverging backwards, smooth anduniformly coloured, legs not flattened, walking legs tips very long (propodus/dactylus ratio, 1.0), 3rd walking legs evidently much longer then the others..... *Sesarma longipes*

36) - front/carapace width ratio <0.5 (Fig. 13a) 37
- front/carapace width ratio >0.5, (Fig. 13b) carapace converging backwards ..... (Genus *Metopograpsus*) 38

37) - carapace almost squarish, one teeth behind the antero-lateral one ..... *Grapsus fourmanoiri*
- 2-3 teeth behind the antero-lateral one, very small species ..... *Ilyograpsus paludicola*

13a) Grapsus fourmanouri

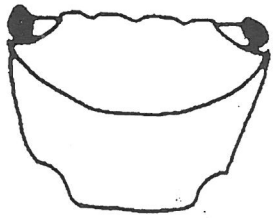


13b) Metopograpsus thukuhar

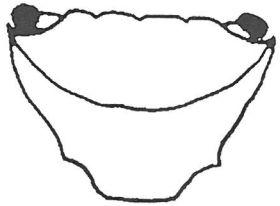
38) - one tooth behind the antero-lateral one ..... (fig. 14a) ..... *Metopograpsus oceanicus*
- no teeth behind the antero-lateral one (or only an accessory notch) 39

39) - carapace converging backwards, maximum carapace/posterior margin width ratio ~2 ..... (fig. 14b) ..... *Metopograpsus thukuhar*
- carapace strongly converging backwards, maximum carapace/posterior margin width ratio ~3 (fig. 14c) *Metopograpsus messor*

14a) M. oceanicus



14b) M. thukuhar



14c) M. messor

40) - walking legs flattened, propodus and dactylus fringed by long dark hair ..... *Varuna litterata*
- walking legs not flattened, no or scarce hair bordering the extremity 41

41) - legs and carapace covered with small dark hair, carapace almost squarish and flat with two teeth behind the anterolateral one ..... *Utica barbimana*
- legs and carapace smooth and not hairy, carapace slightly convex ..... (Genus *Pseudograpsus*) 42

42) - two distinct teeth behind the antero-lateral one, carapace converging backwards ..... *Pseudograpsus elongatus*
- no or indistinct teeth behind the antero-lateral one, carapace not converging backwards ..... *Pseudograpsus albus*

43) - Whole carapace and legs covered with grey long hair ..... *Pilumnus vespertilio*
- carapace and legs not so 44

44) - two well visible big spines on the upper internal face of claw carpus 45
- one visible spine on the upper internal face of claw carpus 46

45) - five big teeth on the antero-lateral carapace margins, carapace widely mottled (usually covered with mud).... *Epixanthus dentatus*
- no visible teeth on the carapace margins, claw with dark fingers ..... *Pseudozius caystrus*

46) - four visible teeth on the frontal margin, lower parts of the body red spotted, molariform teeth on the fingers of the major claw ..... *Ozius guttatus*
- a single central notch on the frontal margin, fingers tips withish, carapace bright violet ..... *Eurycarcinus natalensis*

Lumnitzera racemosa, Kenya

Avicennia marina, Kenya

Bruguiera gymnorrhiza, Kenya

Xylocarpus granatum, Kenya

Ceriops tagal, Kenya

Ceriops tagal (upper)
Xylocarpus granatum (lower)