

CC NOTAE #1

FIRST KNOWN EXTANT *ELSEYA* SPECIMENS (TESTUDINES:
CHELIDAE) BEARING ROUNDED ISCHIAL BLADE MORPHOLOGY -
CRYPTIC SPECIES OR NOVEL ABERRANCY ?

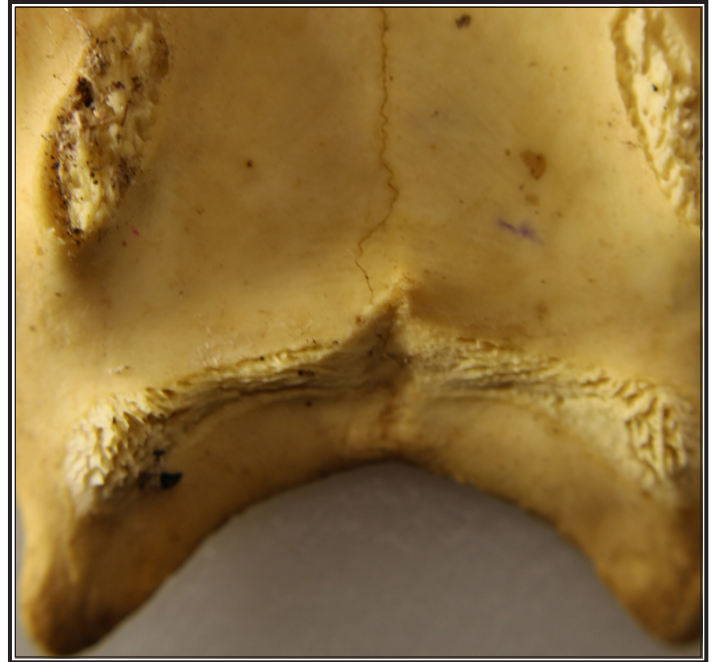
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ABSTRACT. – The inclusion of osteological characters as an essential component of the diagnosability of Australasian chelid turtles on a species level has taken on a higher priority in the last three decades. Genetic and morphological investigations continue to reveal a significantly enriched level of turtle species biodiversity in Australia and New Guinea than previously suspected. One of the characters involves that of the plastral scar and suture of the ischial blade with the visceral surface of the xiphiplastron, distinctly different between the *Elseya/Emydura* lineage and that of *Chelodina/ Pseudemydura*. In this brief communication we here note and assess the first known documented examples of *Elseya* specimens in which the ischial morphology superficially resembles that of the latter group in bearing a semi-circular posterior ischial blade; all specimens are adults from a single river system, potentially indicating the presence of a cryptic taxon in the *Elseya rhodini* complex.

Keywords: *Elseya rhodini*; ischia; chelids; New Guinea; suture scar; *Chelodina*.



The use of bridge skeletal characters in turtle taxonomic diagnosis which focused on the axillary and inguinal buttresses and resulting suture scarring initially figured most prominently amongst fossil species in the early 20th century (Hay, 1908). The morphology of the pelvis and the suture scarring concerning the ilium, pubis and ischium gained further application in fossil turtle species several decades later (Gaffney & Zangerl, 1968; Wood, 1971; Wood, 1997).

Amongst Australasian chelids, Gaffney (1981) first made note of the pubic and ischial scarring on the visceral surface of the xiphiplastron as being potentially differentiable in fossil species of extant genera, which was explored further by Megirian & Murray (1999). The application of the bridge and pelvic suture scars as diagnosable characters amongst extant Australasian species has been limited but was first amplified by Thomson *et al.* (1997) for the axillary buttress strut structure and suture scars in those authors' analysis of Australian and New Guinea short-necked chelid taxa.

In extant Australasian chelid species, the genera *Elseya* and *Emydura* closely resemble one another in the morphology of the suture blade of the pubis and ischium and the resulting visceral scarring. While clear differences exist in part between various species, the overall characteristics have remained surprisingly conservative and somewhat uniform pan-generically. The case is different in the short-necked chelid genus *Pseudemydura* and the long-necked genus *Chelodina* (*sensu lato*), with these osteological characters presenting their own distinctive features and resembling one another, at least superficially. Here we briefly highlight the characters of the pubis and ischium blades and the visceral suture scarring amongst these genera and document the first known species of extant *Elseya* bearing the posterior ischial blade/suture scar morphology that would typically be considered diagnostic of *Chelodina/ Pseudemydura*.

Nomenclature and illustration of the chelid pelvis and posterior plastron is presented in Figure 1. In the genera *Elseya* and *Emydura*, the ventral blade of the pubis is oblong to oval (Figure 1b), often moderately acutely tapering on the anterior end. The suture scar on the visceral surface of the xiphiplastron (Figure 1d) is correspondingly mirror-imaged and positioned obliquely from antero-proximal to postero-distal. It occurs about 2/3rd distal from the midline and 1/3 posterior from the hypo-xiphiplastral suture. For the ventral blade of the ischium (Figure 1c), the distal portion aligns antero-posteriorly parallel to the midline, being broad and rounded on its anterior end and tapering sharply

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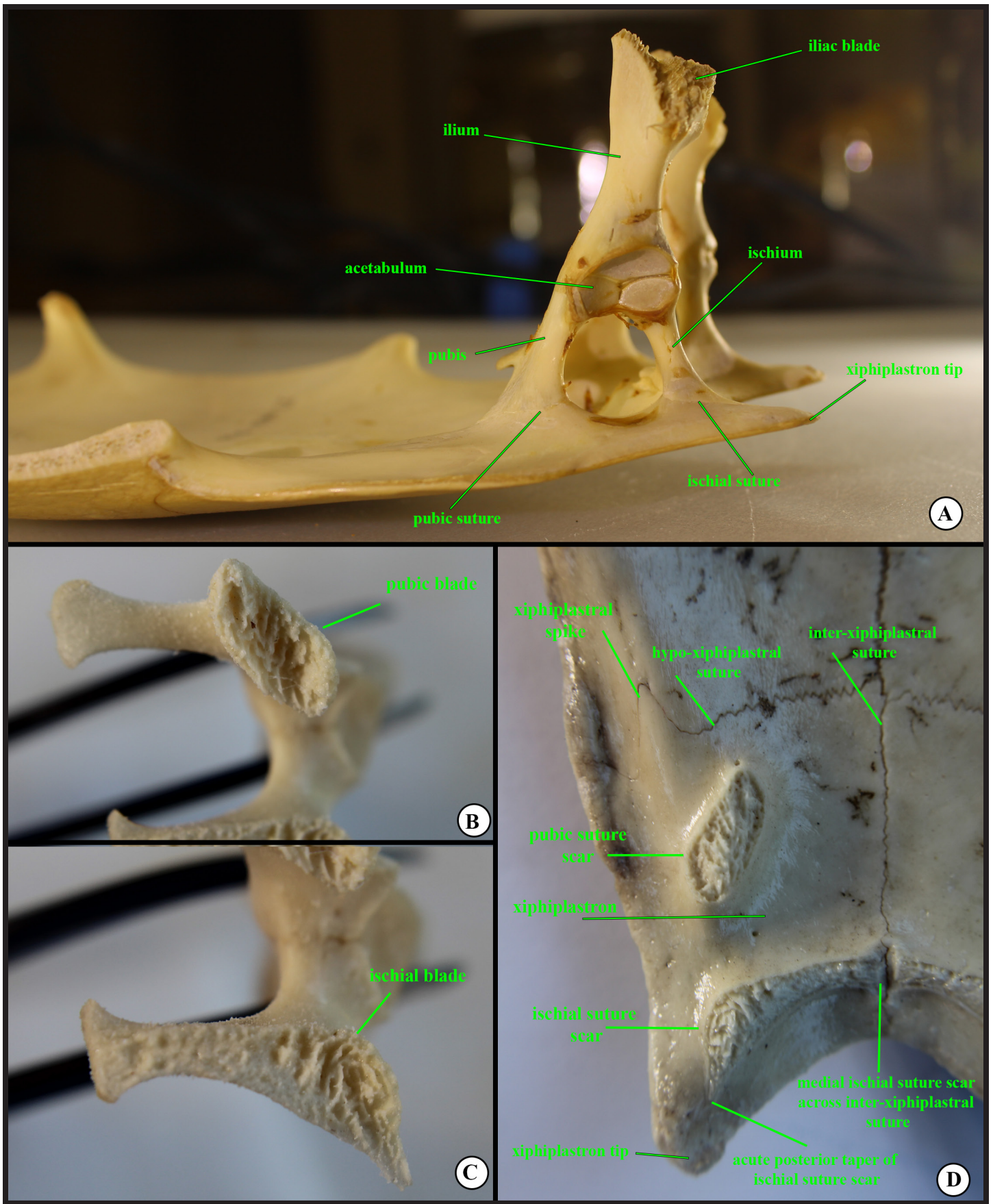


Figure 1. Nomenclature of the chelid pelvis and xiphiplastron: 1a) Left lateral view of the posterior portion of the plastron with the posterior half of the pelvis sutured in place to the xiphiplastron (*Elseya rhodini*, MCZ R-134425); 1b) pubic blade of left pubis; 1c) ischial blade of left ischium; 1d) dorsal (visceral) view of visceral surface of left xiphiplastron (all *Elseya schultzei*, WPM collection).

on its posterior end. The proximal portion of the blade is orthogonal to slightly oblique to the midline, extending from the anterior rounded portion towards the midline. The corresponding ischial scar (Figure 1d) on the visceral surface of the xiphiplastron hence occurs posterior to the pubic scar and is also correspondingly mirror-imaged. The anterior portion of the distal side of the scar starts at the 2/3 rds point posterior to the hypo-xiphiplastral suture and the acute posterior terminus ends just anteriorly short of the xiphiplastral posterior tip. It is positioned relatively close to the exterior border of the xiphiplastron but this varies in taxa. The proximal portion of the ischial scar joins symmetrical with the opposing ischial blade, the suture often running across the inter-xiphiplastral suture.

In the *Chelodina* subgenus *Chebydera* (Figure 2a, *C. parkeri*), the pubic blade and scar are similar in shape to *Elseya/Emydura*, but the scar can vary in its proximal position on the visceral surface of the xiphiplastron. The ischial blade is overall similarly oblique as the pubic scar and lacking prominent distal or proximal portions. The ischial scar is therefore also oblique and varies in extension across midline. The postero-distal portion of the scar is relatively evenly rounded.

In the *Chelodina* subgenus *Chelodina*, the pubic blade and scar in the *C. longicollis* group (Figure 2b) are similar in shape to *Elseya/Emydura*, but the scar is relatively much shorter, with a tapered posterior, and the scar is positioned more proximally on the visceral surface of the xiphiplastron (about midway). The ischial blade is overall similarly oblique as the pubic blade and lacking prominent distal or proximal portions. The ischial scar is therefore also oblique and does not always extend continuously to/across the midline. The postero-distal portion of the scar is relatively evenly rounded but varies from much more roundly inflated to uniformly rounded. The overall ischial scar is relatively much more anterior of the posterior edge of the xiphiplastron.

In the *C. novaeguineae* group in the *Chelodina* subgenus *Chelodina*, the pubic and ischial blades and scars (Figure 2c) are similar to *C. longicollis*, but the pubic blade/scar are relatively larger/longer, with a rounder posterior. The ischial blade/scar are overall similar as well and the postero-distal portion of the ischial blade/scar is relatively reduced or roundly inflated; this portion typically occurs much closer to the posterior edge of the xiphiplastron.

Pseudemydura most closely resembles *C. longicollis* in the shape and positioning of the suture scar morphology of the pubis and ischium. The most notable difference is the greatly inflated/widened overall size of the ischial blade/scar (Figure 2d).

Hence the overall most readily diagnostic difference between the *Elseya/Emydura* lineages and that of *Chelodina/Pseudemydura* regarding the ischial blade surface and scar lies in the extended, strongly acute posterior taper in the former and the shortened, gently rounded taper of the latter. During an examination of museum housed chelid specimens, we came across a unique series of three adult specimens of *Elseya* from a single riverine locality in southern Papua New Guinea that are identified by the senior author as closest to *Elseya rhodini* Thomson *et al.* 2015. These specimens all bear a posteriormost ischial ventral suture blade and corresponding suture scar (Figure 3a-d) that is shortened and gently rounded, superficially resembling *Chelodina* (sensu lato)/ *Pseudemydura*, making them representatives of the first known documentation of this concurrency in ischial suture morphology amongst those genera. The typical state is un/ underdeveloped here, and therefore does not represent preparatory damage to blade or scar. The uniformity of this altered character state in the three specimens from a single locality, along with normal symmetry of the features on both xiphiplastron may therefore represent a novel osteological aberration previously unknown in Australasian short-necked chelids. Interestingly, the posteriormost portion of the xiphiplastral bone surface that would normally contain the apical segment of the suture scar is slightly triangularly elevated in one specimen, indicating the potential for normal ontogenetic development. Typical adult *E. rhodini* show the characteristic posterior acute taper of the ischial blade/scar of the *Elseya/Emydura* lineage (Plate 3e, 3f). Alternatively then the osteological evidence may be indicating the presence of a cryptic taxon within the *E. rhodini* complex of southern New Guinea, or one in sympatry, that we tentatively denote here as *E. sp. cf. rhodini*. A full morphological examination of the remaining skeleton as well as whole preserved or live specimens for taxa comparison would test this idea.

All three adult specimens of this taxon, described below, are identifiable as *Elseya* based on the combined presence of a fully-formed intergular scute, the proportions of the gular to intergular scutes, and shape/position of the axillary-suture scars, and identified further as similar to *E. rhodini* on a species level by the characteristics of the anterior plastral sulci, carapace characters and reliable data of confirmed site of collection. The series was collected by Anders and Susan Rhodin from Giringarede, on the Binaturi River, Western Province, Papua New Guinea, in the boreal spring of 1977.

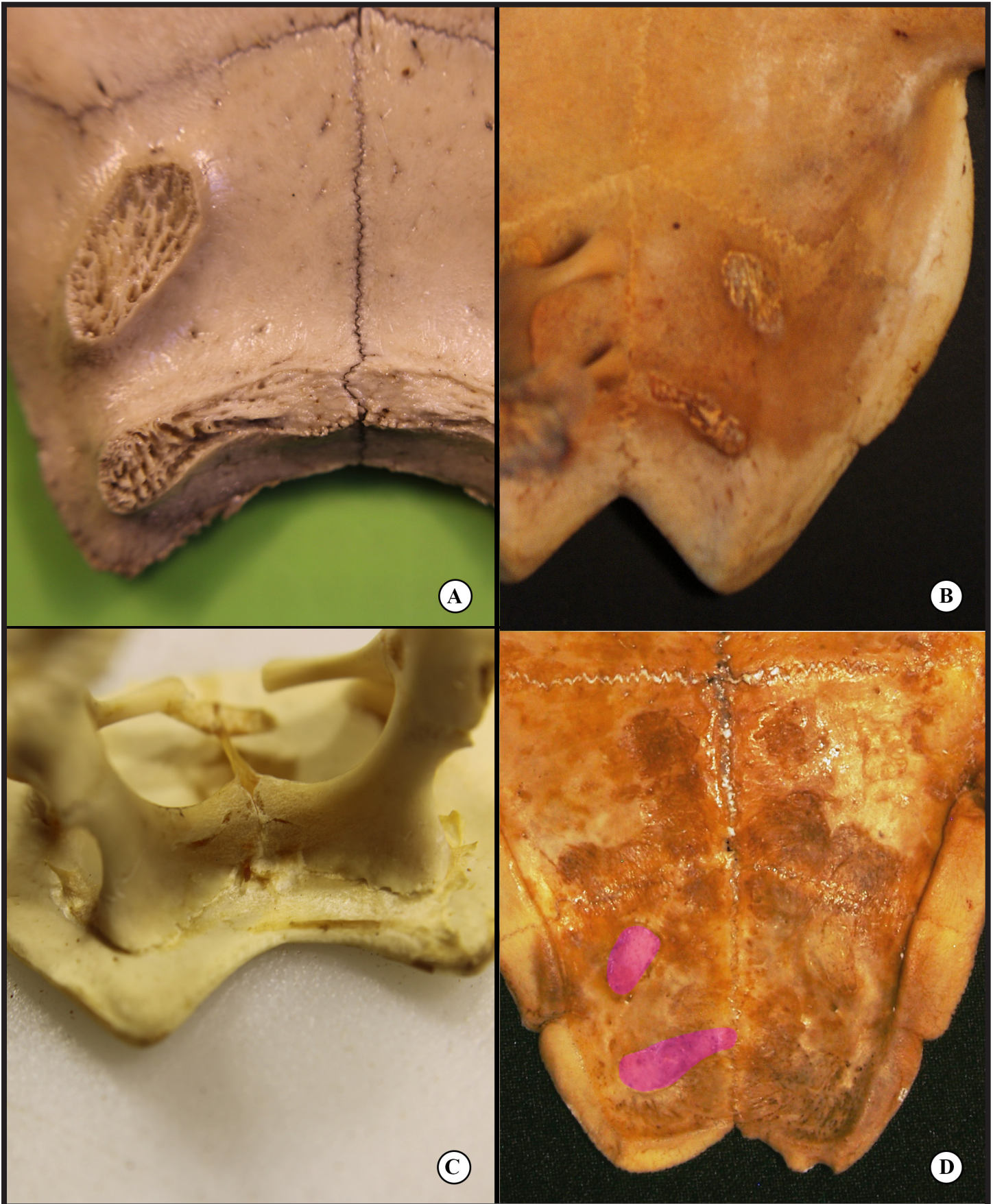


Figure 2. Visceral xiphiplastral suture scars in Australasian chelids: 2a) *Chelodina parkeri*, New Guinea WPM collection; 2b) *Chelodina longicollis*, Bathurst, JC collection; 2c) *Chelodina novaeguineae*, Togo, PNG, MCZ R-134396; 2d) *Pseudemydura umbrina* WAM R29337, magenta highlight for clarity.

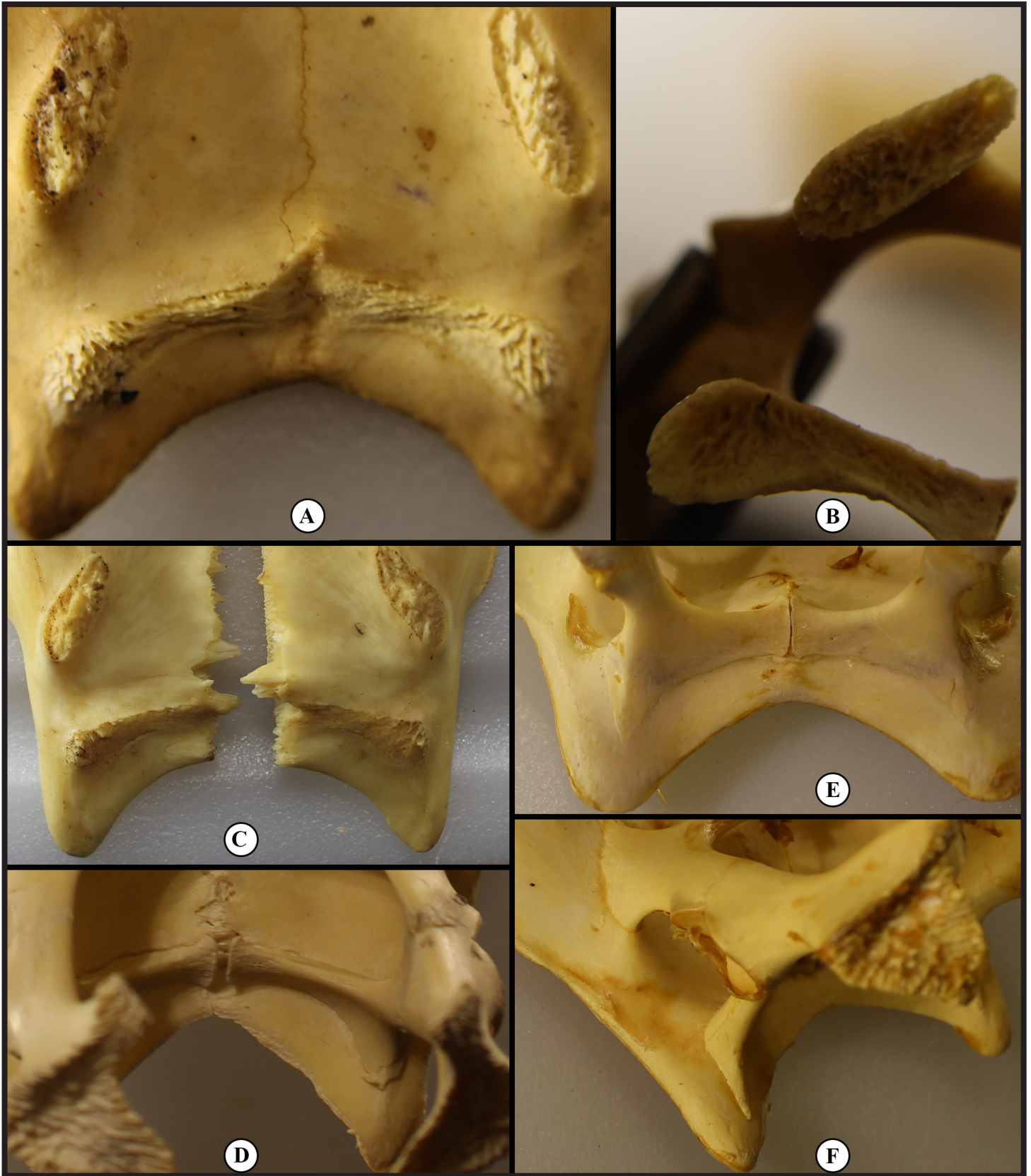


Figure 3. Ischial suture scars and blades in southern New Guinea *Elseya* (*Hannvarachelys*): 3a, 3b): *E. sp. cf. rhodini* Binaturi River, PNG (MCZ R-153050); 3c) *E. sp. cf. rhodini* Binaturi River, PNG (MCZ R-153051); 3d) *E. sp. cf. rhodini* Binaturi River, PNG (MCZ R-153922); 3e) *E. rhodini*, Oriomo River, PNG (MCZ R-134425); 3f) *E. rhodini*, Oriomo River, PNG (MCZ R-134424).

MCZ 153050 represents a prepared, partially disarticulated carapace lacking a cervical scute (a frequent occurrence amongst New Guinea *Elseya*) as well as a prepared partially disarticulated plastron. MCZ 153051 represents a skeletonized prepared plastron of a young adult that is disarticulated along the hyo-hypoplastral suture and along the inter-hypoplastral/ inter-xiphoplastral suture. Finally, MCZ 153922 (Figure 4) represents a prepared, partially disarticulated carapace lacking a cervical scute (again a frequent occurrence amongst New Guinea *Elseya*) as well as a prepared partially disarticulated plastron. Three other specimens, MCZ R-153918, R-153919 and R-134429, same collection data, represent yearling to early juvenile specimens for which the lack of mature development of the ischium hampers further conclusion.

The osteology of the shell of all described *Elseya* is in preparation and will further examine and document the characters of the axillary and inguinal buttress and their corresponding suture scars, as well as those of the pelvic girdle. For now, we make observational note of this series of a potentially cryptic *Elseya* taxon with atypical scarring in which the adults all bear the shortened, gently rounded posterior process typical of *Chelodina* and *Pseudemydura*, and which differ aberrantly from that of typical *Elseya*.

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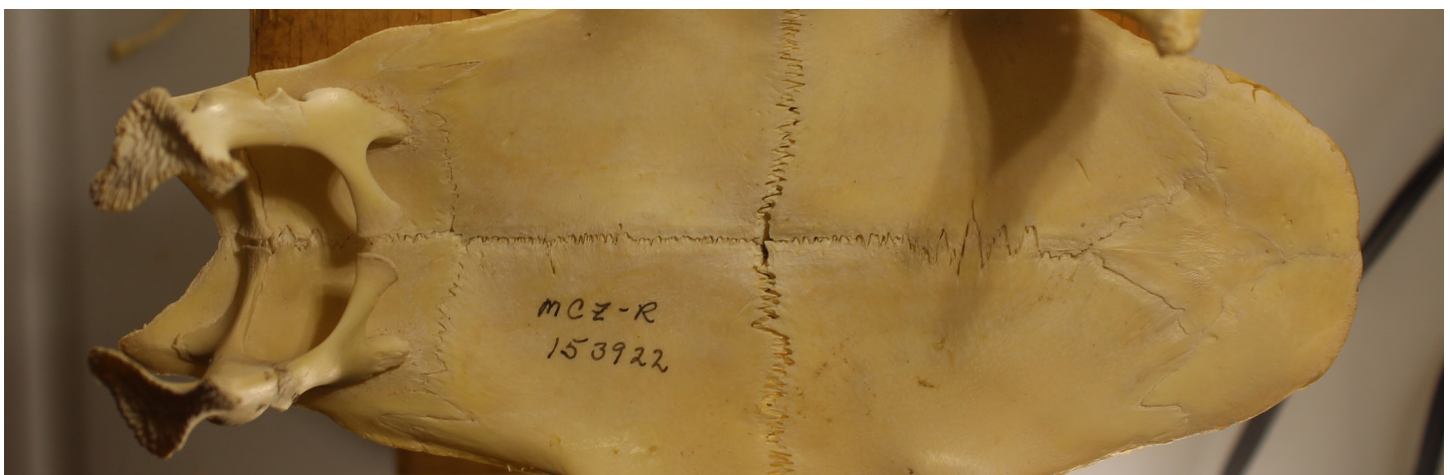


Figure 4. Dorsal view of visceral skeletal plastron of *E. sp. cf. rhodini* Binaturi River, PNG (MCZ R-153922) with pelvic girdle in place.