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Latheticocarcinus punctatus (Rathbun, 1917) (Decapoda, Brachyura) from the Ranch 777 site, Custer County, South Dakota, USA

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Abstract

Discovery of a new specimen of *Latheticocarcinus punctatus* (Rathbun, 1917) at the Ranch 777 site, Custer County, South Dakota, and additional specimens of the species, also from South Dakota, permits description of the flanks and more comprehensive illustration of the species than was previously available. All specimens were collected from upper Campanian–lower Maastrichtian rocks in the Pierre Shale.

Key words: Cretaceous, South Dakota, Brachyura, *Latheticocarcinus*

Introduction

Discovery of a single specimen of fossil crab, *Latheticocarcinus punctatus* (Rathbun, 1917), in association with the remains of a mosasaur in Custer County, South Dakota, USA (Fig.1), and recognition that the specimen preserved aspects of the morphology of the carapace not previously described forms the basis for this note. *Latheticocarcinus* is one of several genera of relatively primitive crabs that are characterized by having suture lines, *lineae homolicae*, that rupture during the molting process. Thus, the extralineal regions, the flanks, are often not preserved with the dorsal carapace. Although published illustrations of *L. punctatus* have documented the presence of the flanks, they have never been fully illustrated or described. As the studied specimen was being described, it was discovered that six additional specimens from the collections of the University of Texas were also available for comparison. These specimens, from three localities in western South Dakota, provided additional information regarding the morphology of the flanks. They provided valuable documentation for the study. Thus, the purpose of this work is to emend the description and more thoroughly illustrate *L. punctatus* and to note new occurrences of the species.

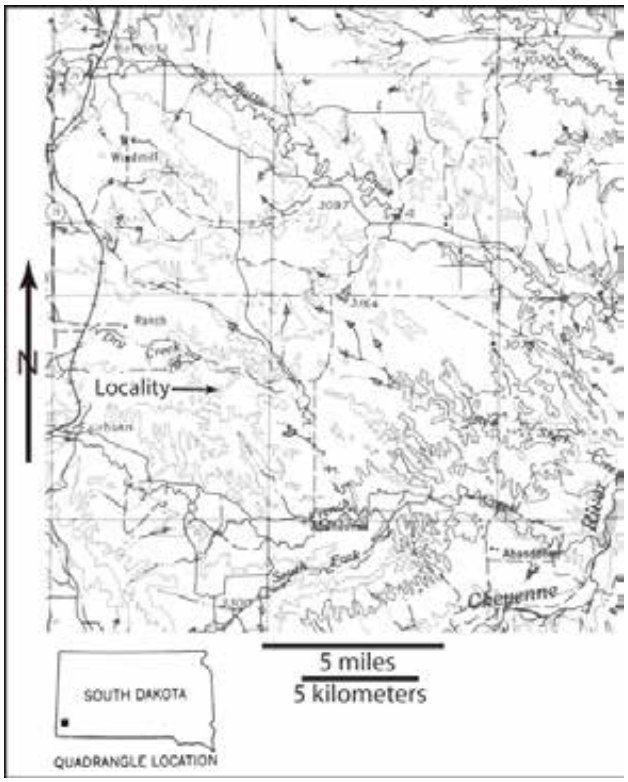


Fig. 1. Location map showing site from which *Latheticocarcinus punctatus* was collected at the Ranch 777 site. Map base from U. S. Geological Survey, Hot Springs, South Dakota; Nebraska 1:250,000 sheet.

Systematics

Infraorder Brachyura Linnaeus, 1758
Section Homoloida Karasawa, Schweitzer, and Feldmann, 2011
Superfamily Homoloidea De Haan, 1839
Family Homolidae De Haan, 1839
Genus *Latheticocarcinus* Bishop, 1988

Type species: *Latheticocarcinus shapiroi* Bishop, 1988, by monotypy and original designation.

Included species: A complete list of included species is given in Schweitzer et al. (2010) and will not be repeated here.

Diagnosis: A detailed diagnosis has recently been published (Feldmann, Schweitzer, and Karasawa, 2012) and will not be repeated here.

Discussion: Bishop (1988, p. 378) originally assigned *Latheticocarcinus* to the Dakoticancridae; however, examination of the type material of *Latheticocarcinus shapiroi* in the U. S. National

Museum of Natural History by us led to the conclusion that the genus actually was referable to Homolidae. The lateral margins of the specimens represent *lineae homolicae* rather than true margins of the carapace. No extralineal parts of the carapace are preserved on the type specimens. Comparison with other known homolids reveals that the conformation of the dorsal carapace, particularly with reference to the form of the regions and the conformation of the groove patterns of *Latheticocarcinus shapiroi* are unmistakably those of Homolidae (Schweitzer et al., 2004).

Latheticocarcinus punctatus **(Rathbun, 1917)**

(Figs. 2, 3)

Homolopsis punctata Rathbun, 1917, p. 388, pl. 33, figs. 1–3.

Homolopsis punctata Rathbun; Bishop, 1981, figs. 13-4C, 13-9B, D.

Homolopsis punctata Rathbun; Bishop, 1982, text-fig. 5.

Homolopsis punctata Rathbun; Bishop, 1986a, fig. 5c.

Homolopsis punctata Rathbun; Bishop, 1986b, fig. 9E.

Homolopsis punctata Rathbun; Tucker et al., 1987, figs. 4.1–4.3. (erroneously inserted as Fig. 2.1–2.3, 5).

Homolopsis punctata Rathbun; Bishop, 1992, fig. 5c.

Latheticocarcinus punctatus (Rathbun, 1917); Schweitzer et al., 2004, p. 136.

Latheticocarcins punctatus (Rathbun, 1917); Feldmann et al., 2012, p. 3, fig. 1.7a–c.

Diagnosis: Rostrum triangular, downturned, sulcate, with raised beaded rim extending onto supraorbital margin. Mesogastric region with small

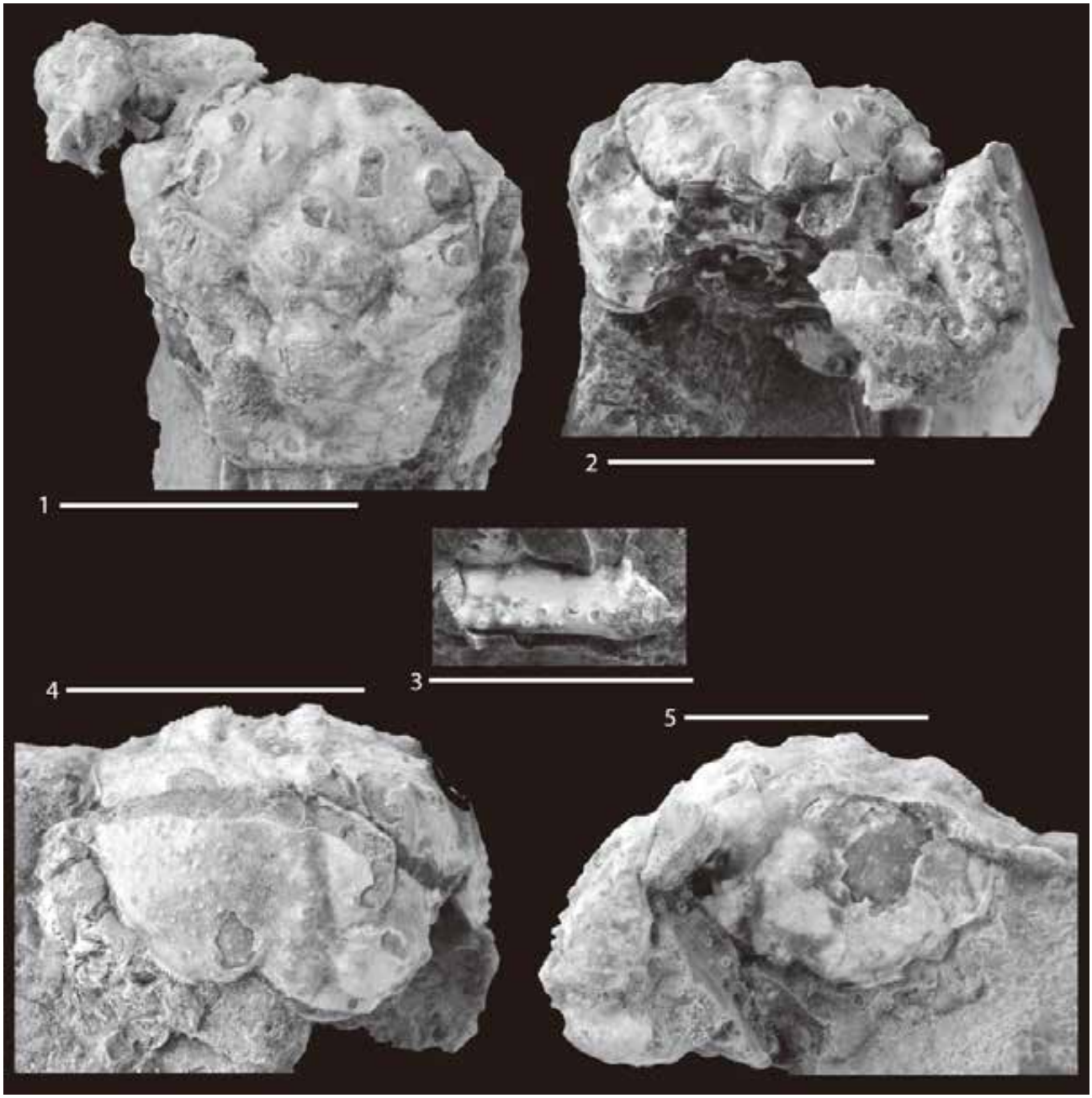


Fig. 2. *Latheticocarcinus punctatus* (Rathbun, 1917), SDSM 100061. 1, dorsal carapace; 2, anterior view showing orbits and left chelipeds; 3, merus; 4, right flank of carapace and bases of pereiopods 2-5; 5, left flank of carapace. Scale bars = 1 cm.

node on anterior process and three ovoid, granular tubercles posteriorly; on triangular field, the anteriormost tubercle is oriented longitudinally on axis and the posterior two are oriented transversely near posterior margin of mesogastric region. Protogastric region markedly bilobed. Subhepatic region bilobed; dorsal lobe with one hypertrophied, elongate spine directed anteriorly; ventral lobe bulbous with smooth concavity

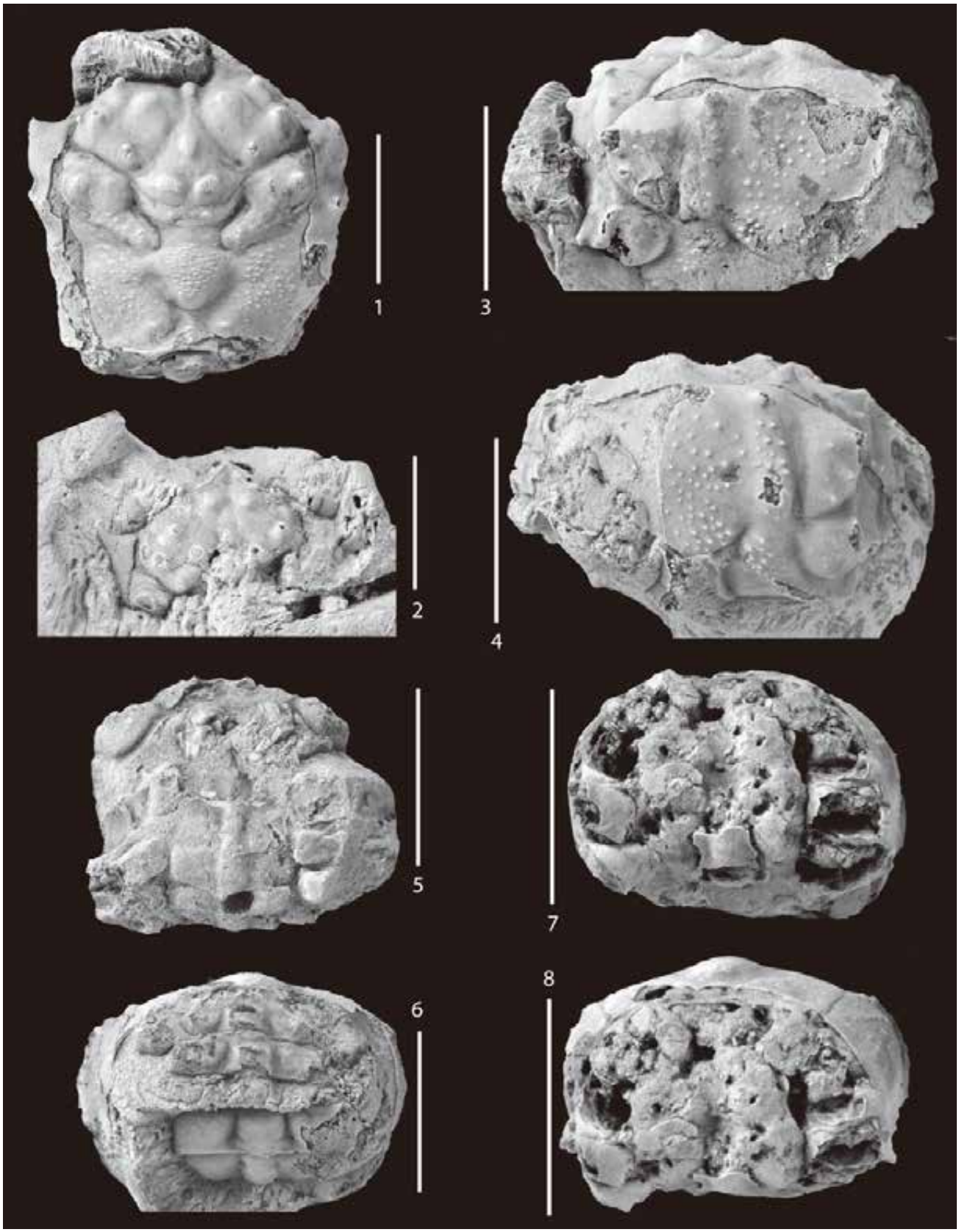


Fig. 3. *Latheticocarcinus punctatus* (Rathbun, 1917). 1, 3, 4, 6, UT 173436, dorsal carapace (1), left flank (3), right flank (4), and female pleon (6); 2, UT 173522, anterior carapace showing eyestalks; 5, UT 173520, female pleon; 7, 8, UT 173521, oblique views of sternum. Scale bars = 1 cm.

(augenrest) anteriorly and at least two small spines ventral to it. Surface of the dorsal carapace generally smooth and bearing granular tubercles anteriorly, becoming granular posteriorly

Description: Carapace longer than wide (width measured between *lineae homolicae)*; width 76–83% length, becoming proportionately more slender in larger individuals; widest between cervical and branchiocardiac grooves. *Lineae homolicae* well developed; extralineal regions well calcified, prominently inflated. Carapace regions well defined by deeply incised grooves. Surface of carapace generally smooth anteriorly with large granular tubercles, becoming granular posteriorly.

Rostrum triangular, downturned; axially sulcate, and with elevated, narrow beaded rim extending onto supraorbital margin. Pseudorostral spines small, blunt; supraorbital spines short, triangular, directed forward and upward. Eyestalks thin, becoming higher distally; eyes very large, constricted at about midlength, fitting into augenrest. Anterolateral and posterolateral margins along *lineae homolicae* convex, weakly sinuous. Posterior margin weakly concave, about 73% width.

Postrostral area sulcate, separating swollen epigastric regions. Mesogastric region with long, parallel-sided anterior process bearing small node at midlength and prominent triangular field 36–39% width and bearing longitudinally ovoid tubercle on axis and two laterally directed ovoid tubercles near posterior margin of region. Protogastric region triangular, bilobed, with two tubercles oriented along anterolateral line and separated by shallow depression. Hepatic region triangular, with two small tubercles and one large tubercle between them, axially located small tubercle may be a cluster of tiny tubercles, three tubercles oriented parallel protogastric tubercles. Cervical groove concave forward, weakly sinuous. Post-cervical groove concave-forward, discontinuous axially.

Metagastric region bilobed, concave forward arc as wide as mesogastric region. Urogastric region narrow, depressed, smooth. Cardiac region triangular, inflated with transversely elongate granules and with transverse processes extending from anterior of region and joining metabranchial region. Intestinal region narrow, depressed, indistinct. Epibranchial region a prominent transversely ovoid swelling bearing one large and one small tubercle, with finger-like extension directed toward urogastric region; remainder of branchial region undifferentiated, only slightly inflated with small nodes flanking intestinal region.

Extralineal flanks oriented perpendicular to carapace surface, high, well calcified, highest anteriorly, becoming lower posteriorly, bordered by finely pustulose rim at least posteriorly. Subhepatic region bilobed; dorsal lobe with one hypertrophied, elongate spine directed anteriorly and upward with triangular field of smaller spines posteroventral to it; ventral lobe bulbous with smooth concavity (augenrest) anteriorly and at least two small spines ventral to it. Cervical groove extends anteroventrally and curves anteriorly ventral to subhepatic region. Branchiocardiac groove broad, extends anteroventrally, parallel to cervical groove to near ventral margin and curving posteroventrally to margin; bounded dorsally by small spines. Subbranchial region granular. Pterygostomial region triangular, smooth, bounded axially by narrow, raised, beaded rim.

Sternum poorly preserved, parallel-sided, axially sulcate; strongly curved to be perpendicular to carapace surface at sternites 7 and 8.

Male pleon poorly preserved, as wide as sternal sulcus; somite 5(?) quadrate, longitudinal raised axis. Female pleon covers entire sternum; somites free; somite 1 narrow; somite 2 wider; remainder of somites broad and tapering posteriorly, pleural terminations straight. Telson triangular, narrow.

Pereiopods poorly preserved. P1 large; propodus slightly longer than high, becoming higher distally; with nodose ridge extending obliquely across inner surface and shallow, broad sulcus along lower surface. Fingers shorter than manus, stout, with granular outer surface; no obvious denticles on occlusal surfaces. P2 and P3 with bases slightly smaller than P1. P4 reduced in size, subdorsal. P5 small, dorsal.

Material studied and occurrence: A single specimen, SDSM 100061, originally labelled TEM-10-93, consisting of a nearly complete carapace with right and left extralineal elements and fragments of pereiopods 1 from Mosasaur Site on 777 Ranch, latitude 43.702212, longitude -103.136134 (=43º 42′ 7.956″ N, 103º 08′ 10.08″ W), Custer County, South Dakota, USA, deposited in the South Dakota School of Mines and Technology Invertebrate Paleontology collection. Comparative material consists of the holotype of *Homolopsis punctata* Rathbun, USNM 32058; four specimens, UT 173522–173524 and 173436, collected from the *Baculites rugosus* level of the Pierre Shale, Thompson Butte, Caputa, South Dakota; one specimen, UT 173521, collected from the *Didymoceras cheyennensis* Zone of the Pierre Shale, at Highway 40 bridge over Cheyenne River, Pennington County, South Dakota; and one specimen, UT 173520, collected from the *Baculites grandis* zone of the Pierre Shale, Mobridge. The comparative material was collected by Gale A. Bishop.

Discussion: The specimen from the 777 Ranch exhibits all the morphological features of the dorsal carapace as described by Rathbun (1917) and as illustrated by Bishop in several works cited above. The arrangement of the tubercles on the mesogastric region and the surface ornamentation are particularly diagnostic.

Wright and Collins (1972, p. 46) suggested that *Homolopsis dispar* Roberts, 1962, and *H. atlantica* Roberts, 1962, both now referred to *Latheticocarcinus*, were synonymous with *H. punctata.* This position was followed by Tucker et al. (1987). However, re-examination of the type material of these three species in the present study confirms that the degree of granulation over carapace surfaces and degree of granulation and overall size of nodes on the carapace surfaces are sufficiently different to warrant separation of all three as discrete species of *Latheticocarcinus.* That position was indicated and documented photographically for the two species named by Roberts by Feldmann et al. (2013).

In previous treatments of *Latheticocarcinus punctatus*, various illustrations of the dorsal carapace showed the edge(s) of the extralineal elements; however, the only illustration of that structure; that is, the flank; is that of Rathbun (1917, pl. 33, fig. 3). She made little reference to its morphology in the description. The flanks of *L. punctatus* are clearly visible on the studied specimen as well as on UT 173521,

173523, 173524, and 173436, making it possible to add an important emendation to the original description of the species. Of particular note is the hypertrophied spine on the upper bulbous part of the subhepatic region visible on a small fragment of the left extralineal element of UT 173436 (Fig. 3.1). This extremely long, slender spine lies over the augenrest observed on the lower bulbous part of the subhepatic region visible on the flanks of UT 173436, 173521, and 173523. The spine probably functioned as protection for the ocular bulb that rested in the augenrest. This eye is well-preserved in UT 173522. (Fig. 3.2).

All of the specimens studied, including that from Ranch 777, preserve the cuticular surface so that it is not possible to determine the morphological differences that might be expressed on the mold of the interior of the cuticle. Thus, the description of the ornamentation on specimens within the species reflects that of the outer surface.

Bishop (1992, p. 63) indicated the range of *Latheticocarcinus punctatus* (as *Homolopsis punctata*) as uppermost late Campanian to lowermost Maastrichtian. The occurrence of the species at the Ranch 777 site is not known precisely, but is presumed to be of the same age.

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