Paleontología Mexicana
Volumen 4, núm. 2, 2015, p. 25-29

A new homolid crab, *Peedeehomola deanbogani* n. gen., n. sp., from the Peedee Formation (late Maastrichtian), Rocky Point Member, North Carolina, USA

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Abstract

A new homolid crab *Peedeehomola* new genus, with *Peedeehomola deanbogani* n. gen., n. sp., is reported from the Late Cretaceous (late Maastrichtian) of the Rocky Point Member of the Peedee Formation (North Carolina). *Peedeehomola deanbogani* n. gen., n. sp. possesses peculiar characters, such as the pseudorostral spine as long as the rostrum, the two supraorbital spines directed forward and the prominent anterolateral spine directed outward, not shared with any known genus within the Homolidae.

Keywords: Brachyura, Homolidae, new genus, new species, Late Cretaceous, North Carolina, USA.

Resumen

Un nuevo cangrejo homólido, Peedeehomola nuevo género, con Peedeehomola deanbogani n. gen., n. sp., es reportado del Cretácico tardío (Maastrichtiano tardío) del Miembro Rocky Point de la Formación Peedee (Carolina del Norte). Peedeehomola deanbogani n. gen., n. sp. presenta características peculiares, tales como una espina pseudorostral tan larga como el rostro, las dos espinas supraorbitales dirigidas hacia el frente y la prominente espina anterolateral, dirigida externamente. Ninguno de estos caracteres se observa en algún género conocido de los Homolidae.

Palabras clave: Brachyura, Homolidae, nuevo género, nueva especie, Cretácico tardío, Carolina del Norte, EUA.

1. Introduction

The type locality of *Peedeehomola deanbogani* n. gen., n. sp. is located at N 34°24'54", W77°55'30" in Rocky Point, Pender County, North Carolina, USA (Figure 1). The location is within the active mining operation of the Mr. Kent Mitchell mine. The mine produces fill sand from the Rocky Point Member of the Peedee Formation for construction sites and road grading.

The Rocky Point Member has seen considerable attention since Swift and Heron (1969) informally described it. The term "Rocky Point Member" was later formalized by Wheeler and Curran (1974). It was subsequently renamed the Scotts Hill Member by Ward and Blackwelder (1978). Use of the original name was defended by Harris and others (1986). Sohl and Owens (1991) placed the Peedee in a sequence stratigraphic framework and noted the time transgressive nature of the Rocky Point Member. Blake and Sturgeon (1995) described an astropectinid asteroid, *Aldebarania arenitea*, from loose arenite in a local quarry approximately 4 kilometers from the *Peedeehomola deanbogani* type locality. Parris *et al*. (2004) describe a possible Azhdarchid Pterosaur femur from the Rocky Point Member at Maple Hill, North Carolina. Ciampaglio and Weaver (2007) report a new occurrence for the regular echinoid *Phymotaxis tourneri* in North Carolina extending

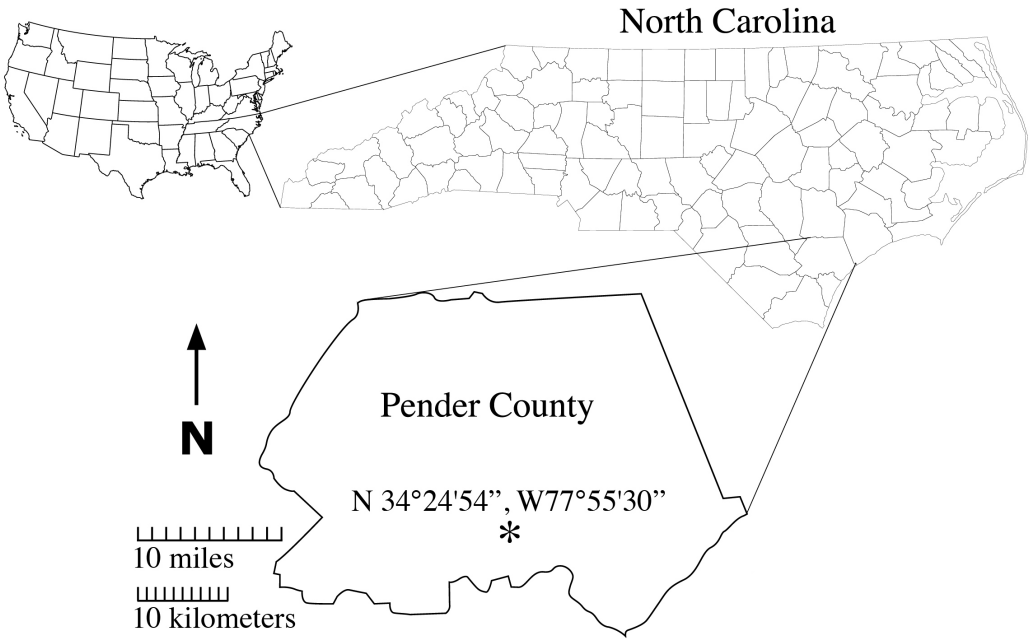

Figure 1. Geographic map with the fossiliferous locality in North Carolina, SE USA.

its known range from Europe through North Carolina to Texas. Their specimens were also from the loose arenite lithology of the Rocky Point Member.

2. Geological setting

Harris (1978) described the Rocky Point Member as being deposited in a shallow marine Cape Shoal complex. The sediments vary from a basal quartz sand arenite, to pelecypod biosparrudite, sandy pelecypod biosparite and sandy biosparudite. The studied specimen was collected from a block of indurated *Flemingostrea subspatulata* (Forbes, 1845) bioherm limestone within the basal quartz sand arenite of the Rocky Point Member (Figure 2). The structure of these oyster bioherms within the loose arenite can be easily observed in the mine due to the removal of adjacent product sand (Figure 3). Because the specimens of *F. subspatulata* are in life position within the indurated blocks we assume that the commensal fauna which includes *Peedeehomola deanbogani* n. gen., n. sp., the complete starfish *Aldebarania arenitea* Blake and Sturgeon, 1995 and the echinoids with spines attached *Hardouinia mortonis* (Michelin, 1850) and *Phymotaxis tournoueri* (Cotteau, 1866) both with spines attached are autochtonous (Figure 4). Longshore sediment drift was suggested by Harris (1978) and presumably a change in drift direction buried the oyster bioherm and its cohabitants. A major storm event may have been the cause of rapid burial resulting in the unusually complete preservation of the fossils. There is no indication of a presumption of conditions suitable for the formation of oyster bioherms in the approximately 10 meters of loose arenite above them.

3. Material

The three-dimensional studied specimen, assigned to *Peedeehomola* nov., with *P. deanbogani* n. sp. (Homolidae De Haan, 1839), is housed in North Carolina Museum of Natural History (NCMNH).

3.1. Abbreviations

lcxp: carapace length; P1-P5: pereiopods 1 to 5; wcxp: carapace width.

4. Systematic Palaeontology

Infraorder Brachyura Linnaeus, 1758
Section Homoloida Karasawa, Schweitzer and Feldmann, 2011
Superfamily Homoloidea De Haan, 1839
Family Homolidae De Haan, 1839

Genus *Peedeehomola* nov.

Type species. *Peedeehomola deanbogani* n. sp.

Diagnosis. Subquadrate carapace with well-marked linea homolica; one pseudorostral spine; two supraorbital spines; one prominent anterolateral spine with two supplementary basal spines; one small posterolateral spine; regions nearly smooth and slightly raised.

Figure 2. Block of oyster reef showing abundance and position of *Flemingostrea* sp. (bottom side up). Scale bar equals 30 cm.

Figure 4. A) *Aldebarania arenitea* and B) *Hardouinea mortonis* on indurated *Flemingostrea* sp. reef. Scale bar equals 20 mm.

Figure 3. Indurated *Flemingostrea* sp. reefs standing out in relief after removal of product sediment.

Etymology. The generic name refers to the Peedee Formation where the studied specimen was collected.

Discussion. Recognition of *Peedeehomola* as a new genus is based upon the pseudorostral spine as long as the rostrum, the two supraorbital spines directed forward and the prominent anterolateral spine directed outward. This combination of characters distinguishes the genus from all other known fossil forms (Bell, 1863; Beurlen, 1928; Bishop, 1983, 1988; Collins, 1997; Collins and Saward, 2006; Collins *et al*., 2005; De Angeli and Alberti, 2012; Feldmann and Schweitzer, 2009; Guinot and Richer de Forges, 1995 and Karasawa, 1992).

Peedeehomola deanbogani n. sp.
Figure 5A, 5B

Etymology. In honor of Dean Bogan, who discovered the holotype and sole specimen.

Holotype. NCMNH12009

Type locality. Rocky Point, Pender County, North Carolina (USA).

Geological age. Late Cretaceous (late Maastrichtian).

Material and measurements. one complete specimen in dorsal view [NCMNH 12009 – lcxp: 40 mm ; wcxp: 35 mm (including the anterolateral spine)].

Description. Carapace – Carapace subquadrate, slightly longer than wide, moderately vaulted transversely, less so longitudinally; lateral sides nearly subvertical; regions almost smooth well marked by grooves; short rostrum not sulcate axially; one pseudorostral spine, as long as the rostrum, directed slightly upward; two supraorbital spines, as long as the rostrum and pseudorostral spine, directed slightly upward; anterolateral margin with one prominent spine directed outward; anterolateral spine with a pair of supplementary small basal spines directed upward; posterolateral margin smooth, with one small spine proximally directed outward; posterior margin wide, slightly concave, with narrow, well-defined rim; cervical groove almost straight proximally and slightly downturned posterior to mesogastric lobe; branchiocardiac groove almost straight proximally downturned posterior to gastric lobe; epigastric lobe defined by a pair of tubercles positioned just posterior to pseudorostral spines; mesogastric lobe marked by smooth grooves laterally and well-defined cervical groove posteriorly; mesogastric lobe with pair of tubercles close to gastric pits; protogastric lobe with one tubercle positioned just posterior first suprarostral spine and one tubercle positioned just posterior first supplementary basal spine of the anterolateral spine; narrow mesobranchial lobe with one tubercle positioned just posterior second supplementary basal spine of the anterolateral spine; metabranchial lobe with four small tubercle aligned along *linea homolica* proximally and medially; metabranchial lobe with four small tubercles nearly aligned centrally; metabranchial lobe with one large tubercle positioned close

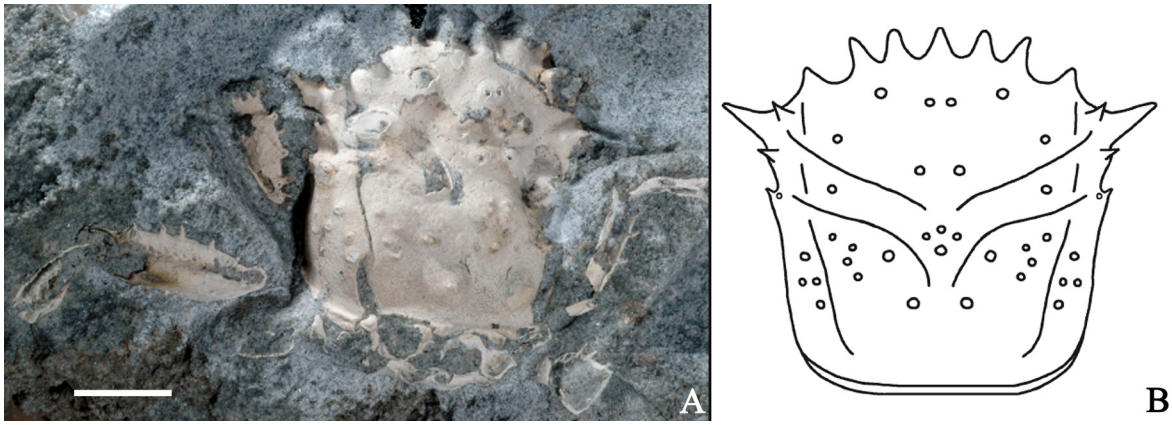

Figure 5. A) *Peedeehomola deanbogani* n. gen., n. sp., NCMNH 12009, holotype, dorsal view. B) Idealized reconstruction of dorsal carapace. Scale bar equals 10 mm.

to branchiocardiac groove distally and one large tubercle positioned close intestinal lobe distally; triangular cardiac lobe with one central tubercle surmounted by three smaller tubercles; intestinal lobe long, narrow, smooth, and slightly depressed. Thoracic appendages – Chelae unknown; P1 left merus partially preserved with spiny margins; P2 and P5 unknown; right P3 long and narrow; P3 merus with spiny lower margin; left P4 stouter than P3; P4 merus with spiny upper margin.

Discussion. Guinot and Richer de Forges (1995) reported three families within Homoloidea De Haan, 1839 as follows: Homolidae De Haan, 1839; Poupiniidae Guinot, 1991; Latreillidae Stimpson, 1858. According to Guinot and Richer de Forges (1995) the *linea homolica* distinguishes Homilidae from Poupiniidae and Latreillidae. Based upon this main diagnostic character, *Peedeehomola* n. gen. is assigned to Homolidae for the presence of a well-marked *linea homolica* not present in the other two families within Homoloidea. According to Schweitzer *et al*. (2010) and De Angeli and Alberti (2012) 14 genera are assigned to Homolidae, as follows: *Dagnadus* Guinot and Richer de Forges, 1995; *Doerflesia* Feldmann and Schweitzer, 2009; Homola Leach, 1816; *Homoliformis* Collins *et al*., 2005; *Homolopsis* Bell, 1863; *Hoplitocarcinus* Beurlen, 1928; *Latheticocarcinus* Bishop, 1988; *Lignihomola* Collins, 1997; *Londinimola* Collins and Saward, 2006; *Nogarhomola* De Angeli and Alberti, 2012; *Paramola* Wood-Mason in Wood-Mason and Alcock, 1891; *Paromolopsis* Wood-Mason in Wood-Mason and Alcock, 1891; *Prohomola* Karasawa, 1992 and *Zygastrocarcinus* Bishop, 1983.

We justify the description of *Peedeehomola* n. gen. for the pseudorostral spine as long as the rostrum, the two supraorbital spines directed forward and the prominent anterolateral spine directed outward. In *Dagnadus* and *Doerflesia* the pseudorostral spine is longer than the rostrum and the supraorbital spines are absent. In *Homola* the pseudorostral spine is shorter than the rostrum and two anterolateral spines. Even though *Homoliformis* lacks the front, the anterolateral margins are smooth. In *Homolopsis*, *Hoplitocarcinus*, *Latheticocarcinus*, *Lignihomola*, *Londinimola*, and *Zygastrocarcinus* the pseudorostral, supraorbital, and anterolateral spines are absent. In *Paromola* the pseudorostral spine is slightly longer than rostrum and the supraorbital spines are absent. In *Prohomola* the pseudorostral spine is shorter than rostrum and supraorbital spines are absent. Finally in *Nogarohomola* the pseudorostral spines are longer than rostrum and divergent.

Acknowledgements

We would like to thank Danièle Guinot, Muséum national d'Histoire naturelle, Département Milieux et peuplements aquatiques, Paris, for useful suggestions about the diagnostic characters of the studied specimen. We would like also to thank Dean Bogan of Burgaw North Carolina for the discovery and donation of the studied specimen. Mine Manager Sean Scanlon and Mine Owner Kent Mitchell generously provided access to this rare near surface exposure. Richard Chandler is acknowledged for his excellent photography. Linda McCall and Donald N. Clements III are also acknowledged for contributing photographs. Steve Hetrick of Harrisonburg Virginia prepared the specimen which was only half exposed before his skillful work. The junior author (DC) would like to thank Edward S. Gilmore (ANSP), J.S.H. Collins (BMNH) and Mark McKoy for camaraderie in the field and technical help over many years.

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Manuscript received: August 3, 2015.
Corrected manuscript received: October 5, 2015.
Manuscript accepted: October 7, 2015.