Methods and materials

• USNM 1139740, dry; the healed (non-regenerating) arm-stump specimen of *Archaster angulatus*.

Summary

• Control specimens: det. and coll. John Keesing; 31°47’37” S, 115°43’1.4” E, Indian Ocean, near Fremantle, West Australia; 8 m depth; 11 Jan 2009.

Description

• The specimen has an arm stump that healed and did not regenerate the arm tip. The stump is well-formed, with no sign of recent injury or recent healing or regeneration: so not a recent event. The affected arm is ray B.
• Intradiscally and on the uninjured arms the skeletal plating is typical. The intact rays are of uniform length; the arm radius (R) is 65 mm; the disk interradius (r) is 12 mm.
• The arm stump is 26 mm long. The stump furrow is 19 mm long and has 14 tube feet in good health on each side of the furrow. The radial nerve cord is visible in the ambulacral furrow. The arm stump is wider (14 mm) than the intact arms (13 mm).
• The tube feet have suckers; there is no evidence of an un-suckered terminal tentacle; there is no evidence of a terminal plate.
• The distal adambulacral plates of the two sides of the furrow arc and join smoothly together near the midline, arranged like a hairpin turn. The distal IMM and SMM of the two sides of the arm arc and join smoothly and form the rounded terminus of the stump.

Taxonomic recurrence of arm stump condition in (1) Archasteridae, (2) Ophiasteridae, and (3) Asteridae ( cladogram of asteroid families from Gale 2011)

Findings

• There are seven IMM on each side before the hairpin turn; six IMM form the hairpin turn. Although slightly unequally developed, the six IMM are explainable as three from each side of the arm. So the stump has ten (7 + 3 = 10) IMM on each side. The 10th IM of the left side is smaller than the rest and is occluded such that it is doubtfully or just barely in contact with an adambulacral plate.
• There is one less SM than there are IMM; the first 8 IMM of each side are aligned with the first 8 SMM. The distal four IMM of the hairpin turn correspond with only three SMM. The well-formed 9th SM of the left side is enlarged and imprecisely overlies the 9th and 10th IMM. The SM at the tip of the arm stump overlies imprecisely/partially the most distal IM (10th) of each side.

Control specimens: It is usual for *A. angulatus* to regenerate an amputated arm. The arcing and joining of left-right ossicles to form a hairpin turn is not seen in regenerating arms.