CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35680

Project Title

Half a Billion Year Old Bed Bugs? The Biology and Ecology of Two Extinct Genera

Abstract

Objectives/Goals

The globally distributed Ediacara biota is comprised of the oldest macroscopic organisms on Earth. They lived on shallow sandy sea bottoms between 575 and 543 million years ago. Most of the taxa are enigmatic and difficult to classify with living animals. Scientists have suggested these organisms to be fungi, arthropods, echinoderms, extinct phyla and other organisms. This research project examines the extinct genera bilaterally symmetrical Spriggina and Parvancorina to constrain their biology and ecology through the testing of three hypotheses: 1) that these organisms grew allometrically like modern bilaterian organisms and the genus Spriggina added segments like modern segmented organisms; 2) that these organisms has size frequencys similar to those of modern continuously reproducing marine invertebrates; and, 3) that these soft bodied organisms were made of different materials and thus exhibit different types of deformations.

Methods/Materials

To test these hypotheses, length, width, frequency and aspects of deformation of each specimen of the two genera were measured from rubber latexes that were made in the field.

Results

Data show that the genus Parvancorina exhibits an exponential or allometric growth like all other marine invertebrates. The genus Spriggina however, showed a linear growth line indicating isometric growth. This is not found in marine invertebrate bilaterians and is a very uncommon method of growth. Both taxa have right skewed size frequency distributions consistent with continuous reproduction. Segment insertion in Spriggina is surprisingly, not governed by size. Finally, Parvancorina was more commonly deformed than Spriggina.

Conclusions/Discussion

These data demonstrate that although Spriggina is bilaterally symmetrical, it does not exhibit bilaterian growth strategies. In contrast, Parvancorina was likely biologically more similar to modern bilaterians than Spriggina. Examination of deformation properties indicate that the two genera were likely made of different material, though neither were biomineralized.

Summary Statement

This project examines two enigmatic 550 may extinct genera in order to test their possible affinities with modern bilaterians

Help Received

This project was conducted with the help of both the University of California Riverside Geology Department.