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Apr 17th, 11:00 AM - 12:00 PM

A Computer Simulation to Evaluate Dispersal by Cloning (Asexual Reproduction) Larvae of Tropical Sea Stars

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Oral Presentation O3.2

**A COMPUTER SIMULATION TO EVALUATE DISPERSAL BY
CLONING (ASEXUAL REPRODUCTION) LARVAE OF
TROPICAL SEA STARS**

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Larvae of some tropical sea stars are able to produce genetically identical individuals by asexual reproduction (cloning). Each "parental" larva has the potential to produce as many as 6 new individuals. Although cloning by larvae should increase the dispersal potential of each cohort of larvae (and their respective genomes), empirical evidence is absent. To assess the potential of sea star larvae originating off the African coast to be carried over prevailing ocean current (South Equatorial Current, SEC) to South American was studied through the development of a computer simulation. The simulation assumes an initial population size of 100,000 individuals from a single spawning event off the coast of Africa, which enter the SEC (11.3 cm / s) and are carried toward the east coast of South America, distance of 3788 km. Each individual (and subsequent offspring) was followed throughout its entire lifetime or until it reached South America. Although no individual larva that enters the SEC is predicted to travel the entire distance (complete development requires ca. 30 days), each individual's genes may travel through successive generations of clones. The effect on instantaneous mortality rates and cloning frequency on the number of larvae that survive the complete dispersal to South America was assessed. This simulation will predict the conditions that must occur in order for cloning by larvae to have a significant influence on the potential for transatlantic dispersal.