Testing the Effectiveness of Various Shading Materials to Mitigate Effects of Climate Change on Mock Leatherback Sea Turtle Nests

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Leatherback sea turtles are a critically endangered species in the eastern Pacific, especially due to climate change. When sand temperatures increase above 29.5 degrees Celsius, the hatchlings produced are predominantly female due to an enzyme aromatase in the egg causing testosterone to change to estrogen. To decrease sand temperatures in efforts to increase number of males hatching, I implemented shading structures with various materials on Penfield Beach in Fairfield, CT. I tested four materials: agricultural plastic netting, biodegradable plastic, burlap, and palm fronds, and a control. I stapled the materials around and on top of the four wooden stakes, which were hammered into the sand over the mock sea turtles nests. I buried three tennis balls in the nest at the depth Leatherback sea turtles eggs would be at: 75cm. I attached a thermometer to twine and buried it along with the balls. I conducted the experiment over two days, recording the temperatures every two hours from 8am to 6pm. I also tested the permeability of the plots by pouring two liters of water on top of each material and digging into the sand and measured with a ruler to see how deep the moisture reached, compared to the control plot. Palm fronds were found to be the most effective in maintaining a low sand temperature of 29 degrees Celsius. They also let in the most water after the control. The control plot with no shading material yielded a temperature of 37 degrees Celsius by the end of the day. These results were favorable because palm fronds are in high abundance in the eastern Pacific and thus a cost-effective strategy to shade sea turtle nests, particularly at man-made turtle nesting hatcheries where humans constantly monitor the site.