

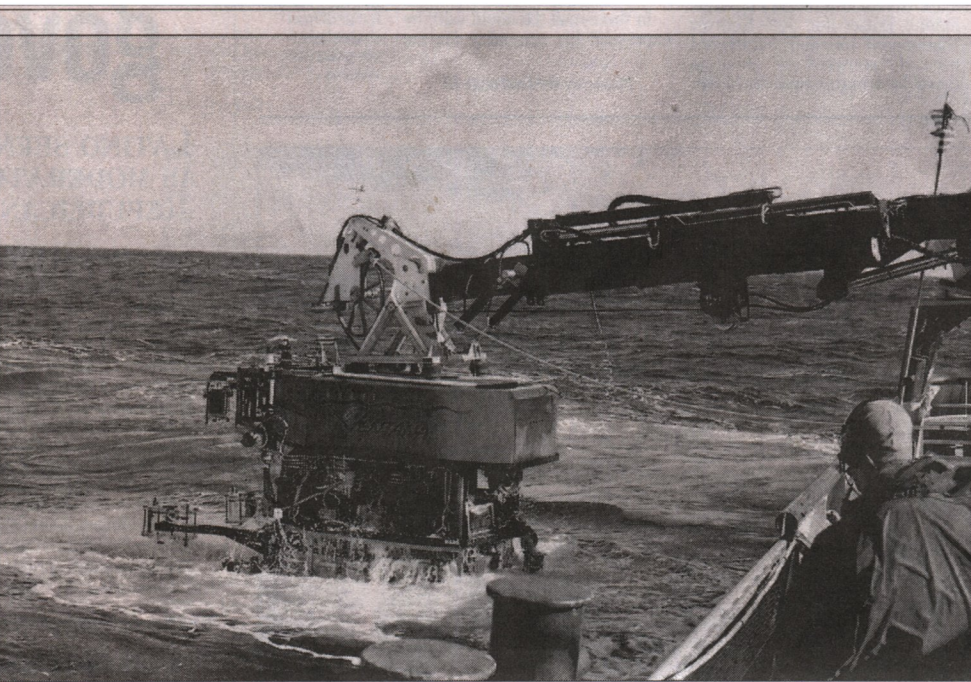
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JANE PARKER/Special to The Herald

D.J. Osborne pilots the remote-operating vehicle Ventana on its mission.

OCEAN CHASE

SCIENTISTS STUDY TINY CREATURES TO MEASURE SEA CHANGES

By JANE PALMER
Herald Staff Writer

A pinkie-sized, tadpolelike creature was giving the runaround to nine men, one 110-foot-long boat and an underwater robot the size of a Volkswagen bus. "Now it is getting personal," said D.J. Osborne, pilot of the remotely-operated vehicle Ventana. Osborne had spent five minutes chasing the creature with the Ventana's robotic arm at 900 feet below sea level.

"I'm not letting this one get away,"

Osborne said.

Not to be beaten, Osborne brought out his secret weapon: a deep-sea vacuum.

One flick of the switch and the vacuum nozzle sucked the giant larvacean, whose name belies its diminutive size, into an underwater canister.

Mission accomplished.

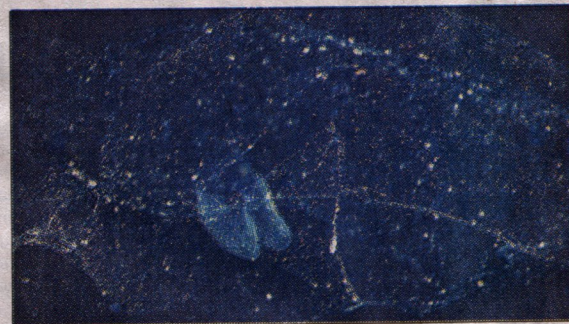
Scientists from the Monterey Bay Aquarium Research Institute are collecting larvaceans, a key species in the marine food chain, to study how ocean

ecosystems may be changing as a result of global warming and pollution.

"These changes potentially have huge implications," said Bruce Robison, a marine biologist at MBARI. "We are trying to measure what the consequences will be."

As more carbon dioxide enters the oceans, as well as the atmosphere, oxygen levels in the cold, dark zone between the ocean floor and the

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MBARI/Special to The Herald

A larvacean house: The creature lives in the butterfly-shaped inner chamber. The larvacean is too small to be seen here.

Ocean

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surface slowly decline. Starved of oxygen, many inhabitants of this midwater "dead" zone are migrating.

"Some of these species have been pushed up to the surface, and others have been pushed down deeper," Robison said. Both the surface and the ocean floor offer more oxygen for creatures, he said.

Robison and his colleagues are studying the larvaceans to determine how they react to lower oxygen levels. The scientists trap the creatures in underwater canisters, keep them alive underwater in their natural environment and measure their breathing rates.

"How low does it have to go before they move?" Robison said. "That is one of the things that the respiration measurements will tell us."

Their choice of species was not random. Larvaceans are a key species in the ocean ecosystem, supplying food to many ocean floor creatures. Daily, they build large mucus houses measuring up to 3 feet long and then discard them.

"These are made of mucous but they are surprisingly intricate," Robison said.

The larvacean house, once abandoned, deflates to form a parachute-like structure called a "sinker" that drops to the ocean floor. The ocean debris and tiny animals that are trapped in its mucous

walls are a valuable food source for deep-sea animals.

"In Monterey Bay, it can be a third of the organic material that feeds the deep sea floor community," Robison said.

But as the oxygen in their natural environment becomes scarcer to larvaceans, this vital link in the food chain could be broken.

"The species is being pushed up closer and closer to the surface," Robison said.

As larvaceans migrate upward, the chances are that their nutritious houses will shrink and become slimmer. Strong currents will tear apart the delicate parachute shaped structures, dispersing the morsels into a vast surface soup.

"The consequence may be a changing food supply to the animals on the deep sea floor," Robison said.

Currently, Robison's experiment is focused on documenting the changes that are taking place: how much oxygen the larvaceans are using and how much they are migrating. Ideally, however, he wants to be able to predict the consequences of an ocean with less available oxygen.

"We want to say with confidence that if we keep moving in this direction, this is what is going to happen and this is why it is going to happen," Robison said. "Instead of just waving our hands in the air and saying the sky is falling."

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