

## PRELIMINARY CRUISE REPORT

12 July 2004

<b>U.S. Dept. of State CRUISE No.:</b>	2004-007
<b>SHIP NAME:</b>	S/V Sorcerer II
<b>OPERATING INSTITUTE OR AGENCY:</b>	Institute for Biological Energy Alternatives
<b>PROJECT TITLE:</b>	Sorcerer II Global Expedition
<b>CRUISE DATES (INCLUSIVE):</b>	Initial requested cruise dates March 25 – May 15, 2004 Resubmitted cruise dates March 25 – May 20, 2004 Final Approval April 22, 2004 Sampling dates May 17 – 20, 2004

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## **DESCRIPTION OF SCIENTIFIC PROGRAM (include page-sized chartlet showing cruise track):**

The Sorcerer II Expedition is circumnavigate the ocean evaluating marine “community” microbial biodiversity using fundamentally new methods developed during a pilot project conducted in the Sargasso Sea last fall in collaboration with the Bermuda Biological Station for Research, BBSR (Venter et al. 2004, *Science* 304: 66-74). We have embarked on an extensive year and a half long global sailing voyage of discovery exploring microbial biodiversity using a “whole environment” genomics approach. The overall goals of our research in waters of French Polynesia were to:

- Characterize the microbial diversity in ocean waters of French Polynesia,
- Discover the complex interplay between groups of microorganisms that affect the environmental processes of regional and global importance.

Thus far, we have successfully sampled in waters of Bermuda, Canada, the United States, Mexico, Honduras, Costa Rica, Panama, Ecuador (the Galapagos Islands), French Polynesia, the Cook Islands, Tonga and Fiji and every 200 miles in international waters. Thus far, we have worked closely with regional scientists in all legs of the voyage. We will proceed onto Australia and will continue to sample across the Indian Ocean, proceed around the Cape of Good Hope, South Africa and sample across the Atlantic, to South America and through the Caribbean.

An oceanographic CTD device was deployed at five (5) sites (Fig. 1; Table 1) to determine the physical characteristics of the water column, and a 200 L non-intrusive water sample was collected from a specified depth using a water pump and tygon tubing. The collected microbes were size fractionated by serial filtration through 20  $\mu\text{m}$  nytex, 3  $\mu\text{m}$ , 0.8  $\mu\text{m}$ , and 0.1  $\mu\text{m}$  membrane filters, and finally a 50 Kda cut-off tangential flow filter. The filters, with the captured organisms, were placed in a -20 °C freezer on the research vessel until transport back to the laboratory. On return to the lab, the filter will be subjected to enzymatic lysis to collect the DNA. The DNA will be randomly sheared and cloned into plasmid vectors for sequencing using previously developed methods.

The data from this voyage will advance our basic understanding of oceanic biology by discovering the complex interplay between groups of microorganisms that affect the environmental processes of regional and global importance. Our analysis, when complete, should yield insight into the identification and examination of the most abundant microbial strains in an environmental sample. This information will be used to determine the overall species diversity of *in situ* microorganisms, discover and characterize novel bacterial and viral species, and evaluate the ecological roles the dominant (but often unculturable) microbes play in the ecosystem.

The global sampling expedition aims to create great benefit to the public and scientific communities in French Polynesia and throughout the world by publishing basic scientific research. IBEA will not pursue intellectual property rights to any of the genomic data.

### Publication and Dissemination of Information.

In order to make data rapidly and readily available to the global scientific communities, all results of the genomic analysis will be released to our collaborators and French government officials and released to the public domain through a new environmental genomics database that we are establishing with the National Center for Biotechnology Information (NCBI). These data will significantly advance the new discipline of environmental genomics. The data should be tremendously useful to scientists or institutions for studies of biodiversity, ecology, evolution, and health and will provide an exciting opportunity to merge scientific knowledge and expertise to address issues of mutual concern and importance. We anticipate submitting the results of this research to an accredited scientific journal.

<b>SCHEDULE OF DATA DELIVERY:</b>	
Data Description	Expected delivery to the U.S. Department of State
DNA sequence data and species list	Expected delivery by June 20, 2005
Final cruise summary report	Expected delivery by June 20, 2005

**Table 1** Locations of collected water samples

Site	Location name	Depth (m)	Location (Lat/Long)
1	Moorea, Cooks Bay	1.2	17° 28.551'S; 149° 48.733'W
2	Moorea, Cooks Bay	1.2	17° 27.182'S; 149° 47.939'W
3	Tikehau Atoll	1.1	15° 16.661'S; 148° 13.459'W
4	Rangiroa Atoll	1.2	15° 8.61'S; 147° 26.1'W
5	Open Ocean	1.2	17° 59.22' S; 154° 16.36'W

**Figure 1** - Charts showing location of oceanographic water samples taken (black circles) as part of the Sorcerer II Expedition. Lines indicate maritime boundaries.

