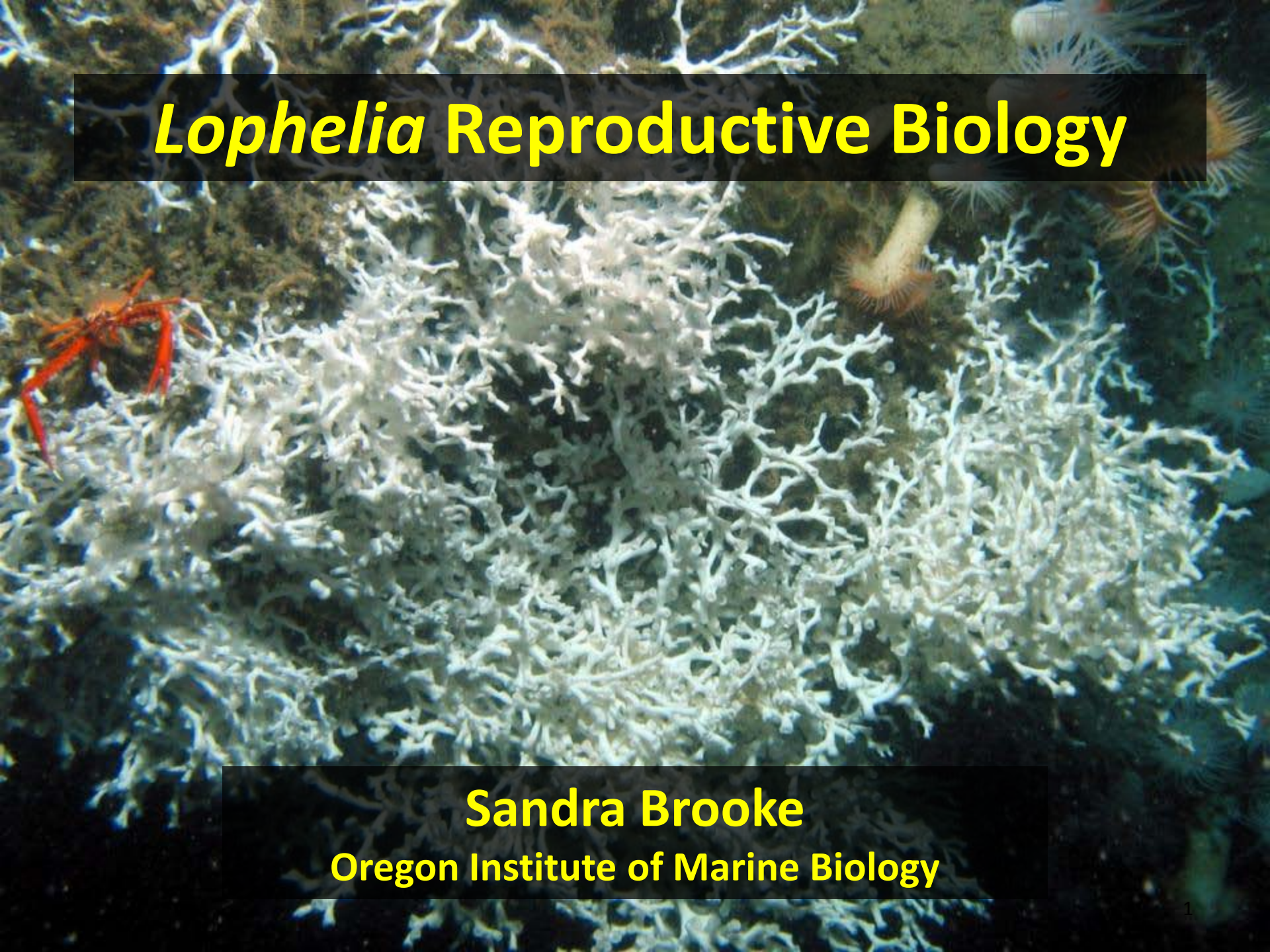


Lophelia Reproductive Biology

Sandra Brooke
Oregon Institute of Marine Biology

Objectives

1) add to existing database on reproductive status of *L. pertusa* and complete description of the gametogenic cycle
2) correlate physical oceanographic data (temperature, currents, food supply) with gametogenesis in *L. pertusa* (and other species if data are sufficient)
3) correlate food supply to the benthos with coral lipid content and reproductive output
4) assess reproductive status of other dominant cnidarians including *Leiopathes* spp., *Keratoisis* spp., *Callogorgia a. delta* to determine if reproductive cycles are synchronous across various taxa

Scleractinian samples collected

2009:

August	39 *Lophelia*
September	41 *Lophelia*

2010

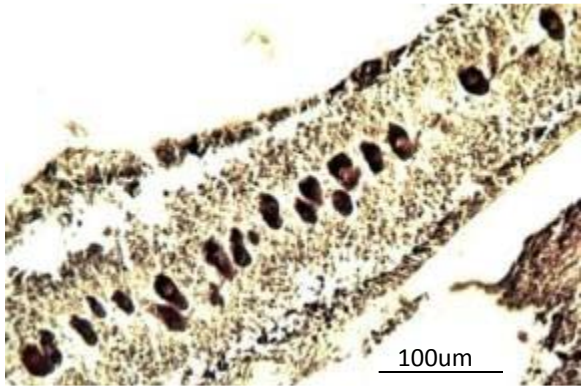
September	46 *Lophelia*	12 *Madrepora*
October	6 *Lophelia*	

Samples from the Southeastern U.S. can supplement this data if the corals are on the same reproductive cycles.

Lophelia gametogenesis

Multiple small fragments from different colonies were sampled during both cruises and fixed in 5 – 10 % Formalin. Samples were decalcified and processed using standard histological techniques. Oocyte diameter was measured for 100 oocytes per fragment

November

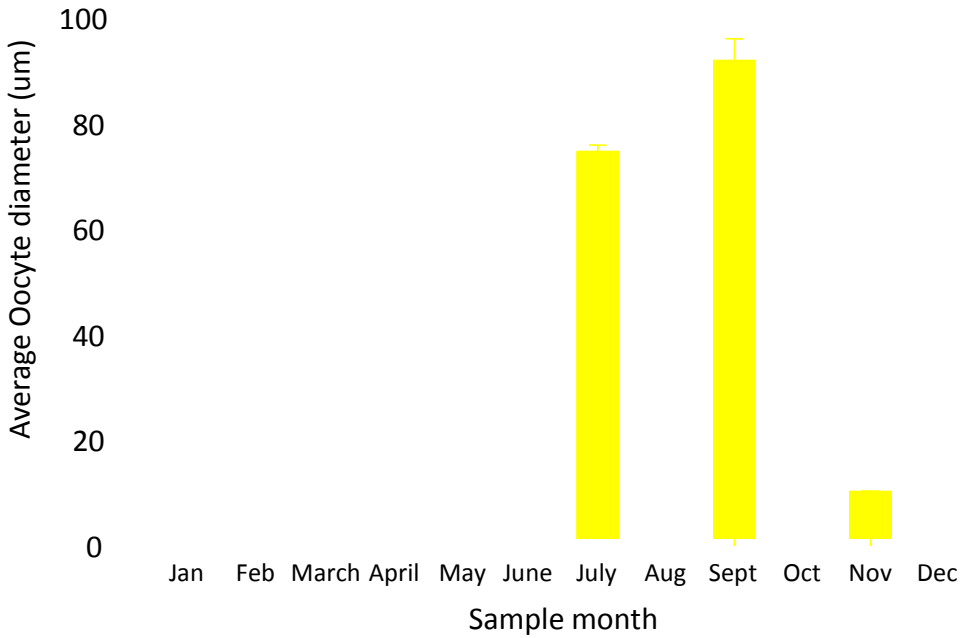


July

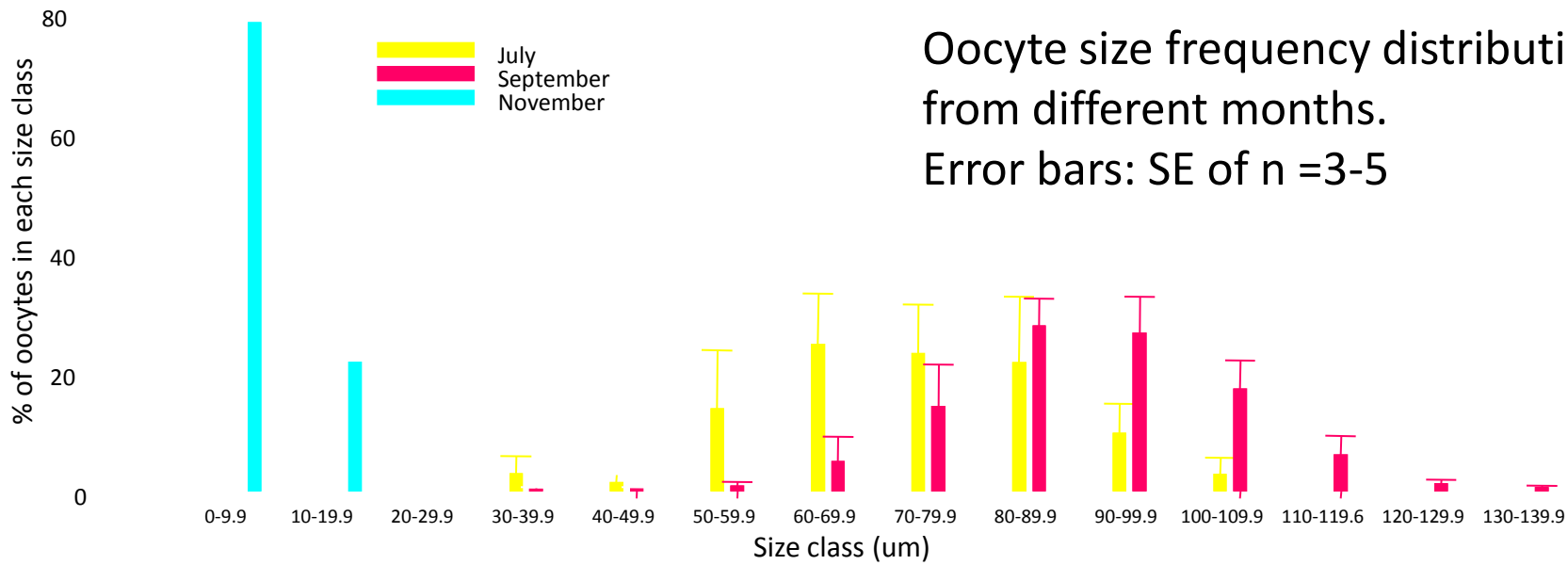
September

nucleolus

Lophelia reproduction



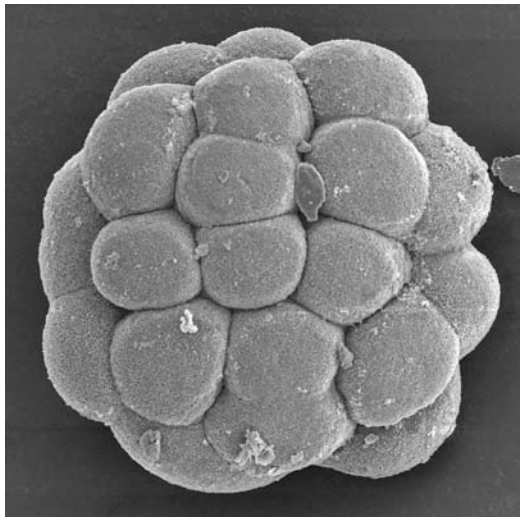
Seasonal changes in *Lophelia* oocyte diameter, indicating that spawning occurs in late September or October. Error bars: SE of n=3-5

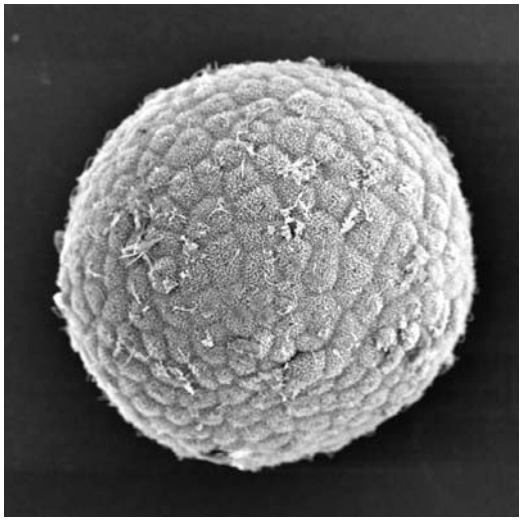


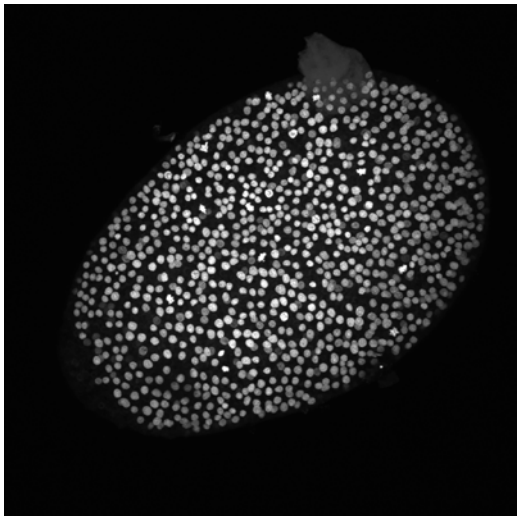
Oocyte size frequency distribution from different months.
Error bars: SE of n =3-5

Spawning observations

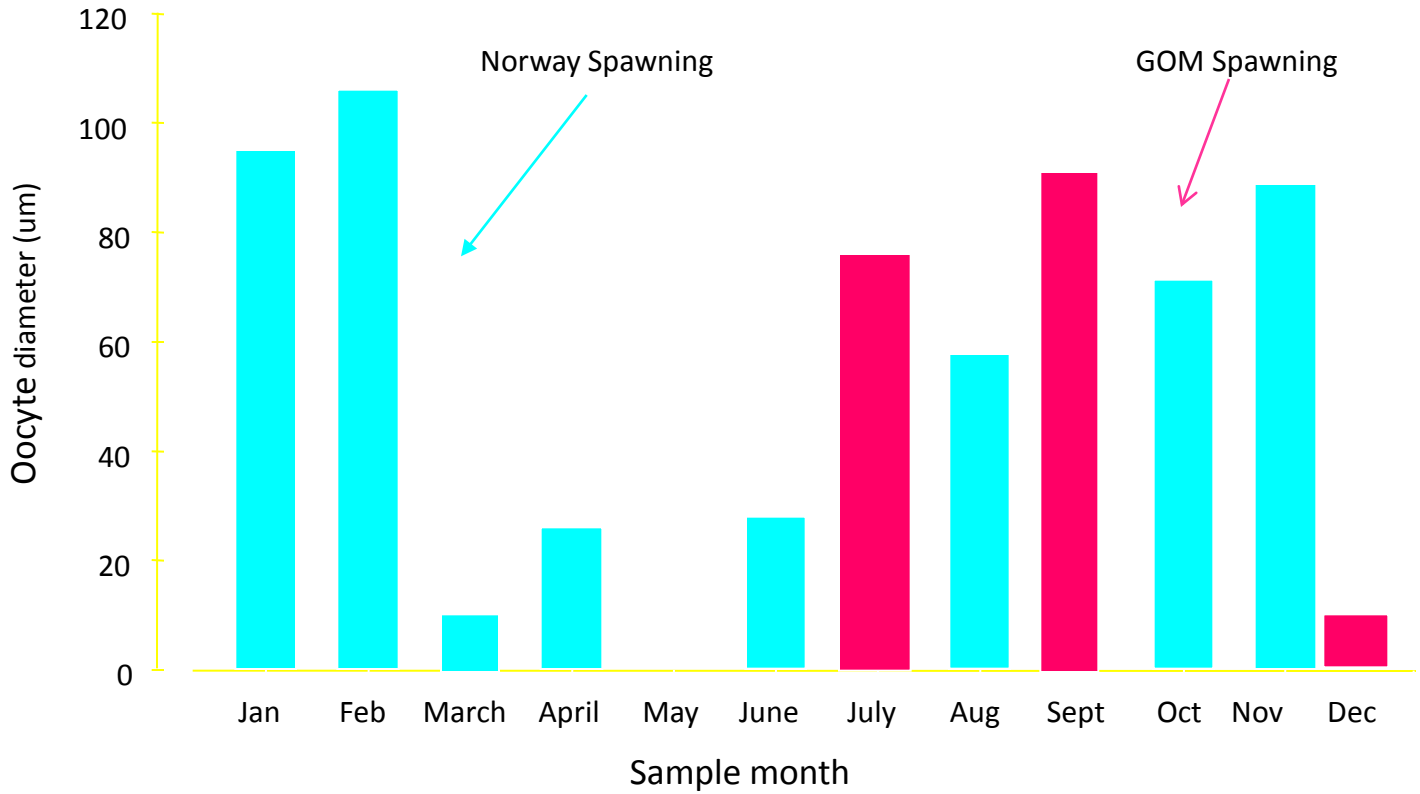
2009: September 23, 26–29
2010: September 29, blastulae observed



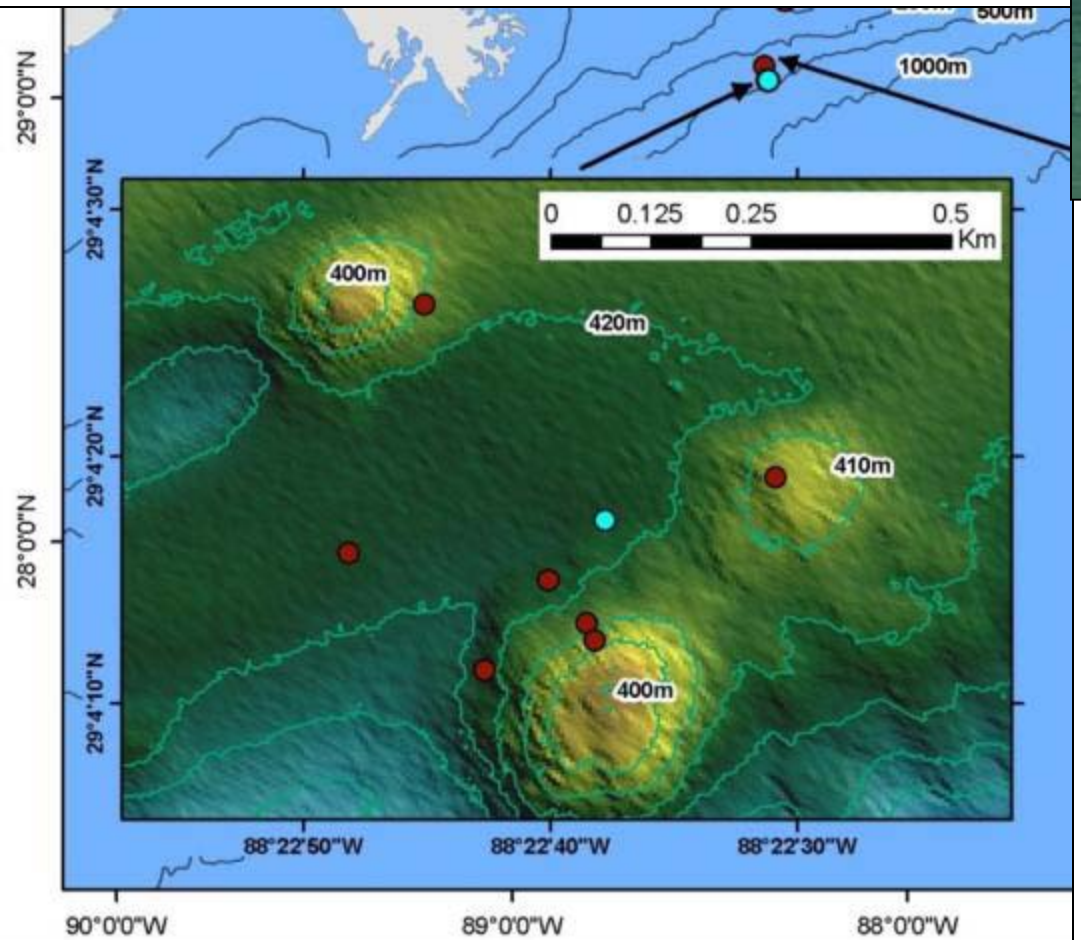


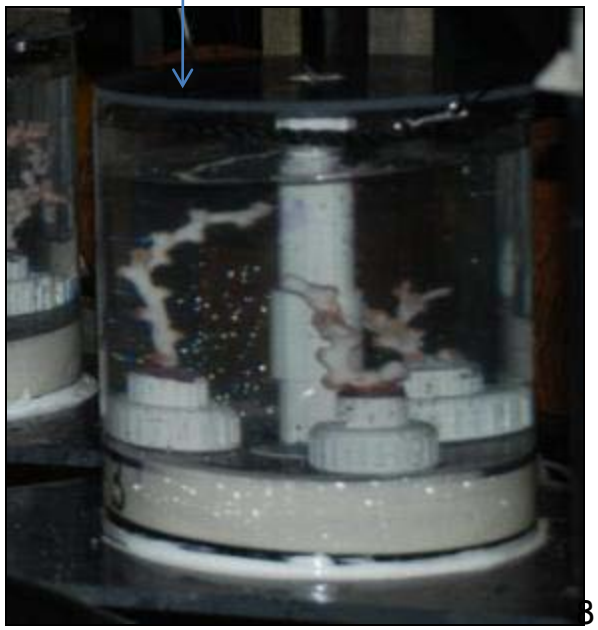


Comparison of the gametogenic cycles of *L. pertusa* from Norwegian Fjords and northern Gulf of Mexico



Lander deployed at VK 906
October 2010



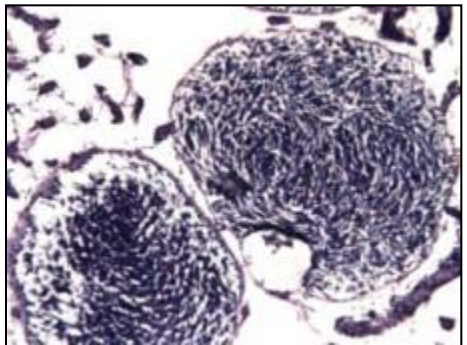


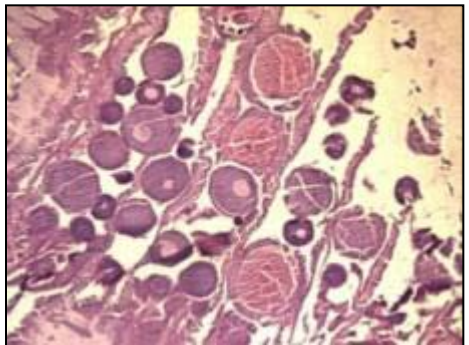
Lander data will provide

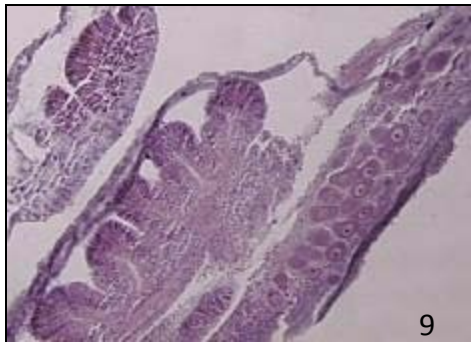
Seasonal temperature cycles
Patterns of zooplankton migration
Food delivery cycles
Sediment load
Oxygen
Periodicity of current speed and direction
Timing of larval presence (possible)

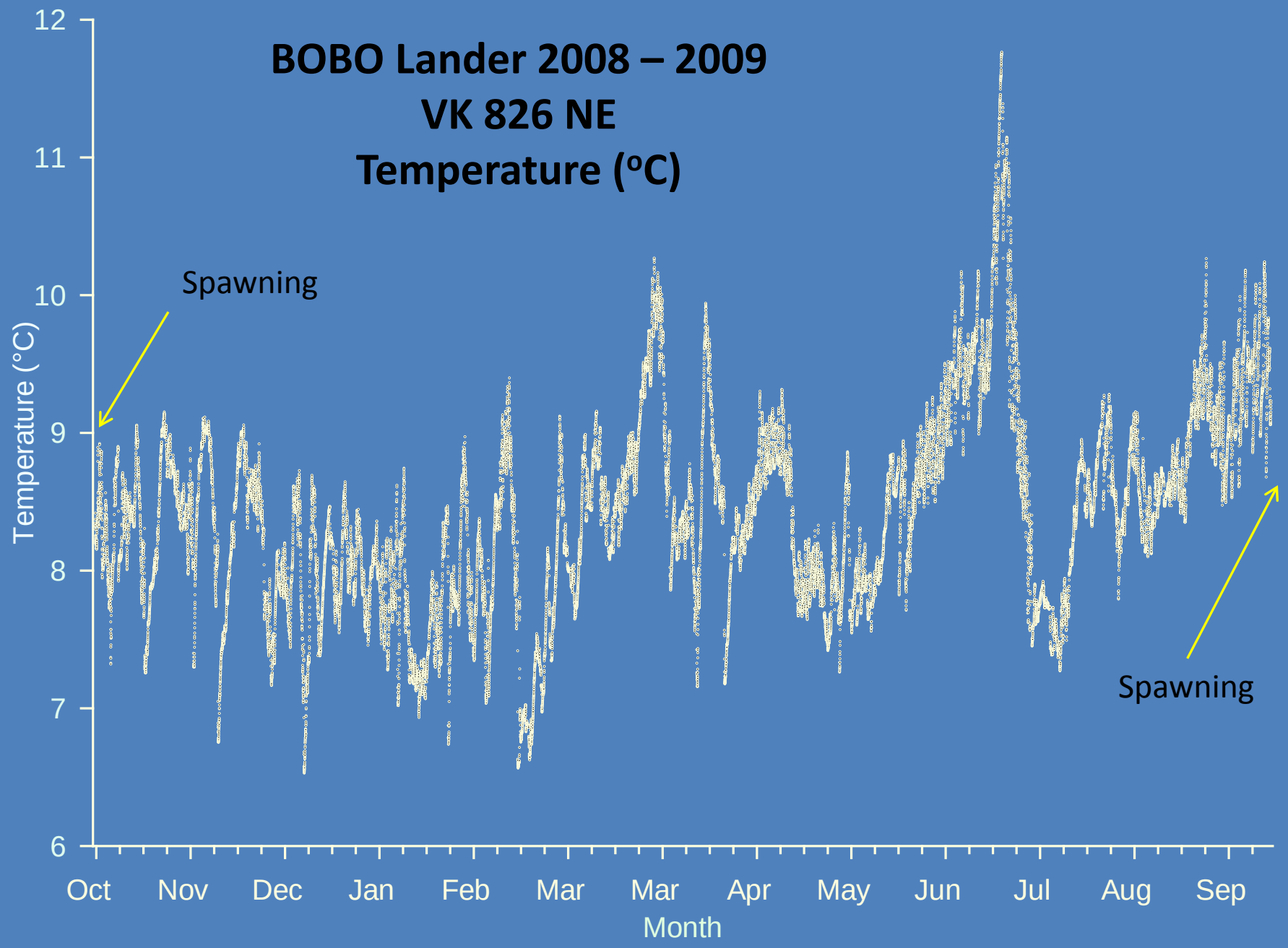
Coral analysis will provide

Timing of gametogenesis and spawning
Seasonal patterns of lipid content
Fecundity
Overview of deepwater coral reproduction in the GOM

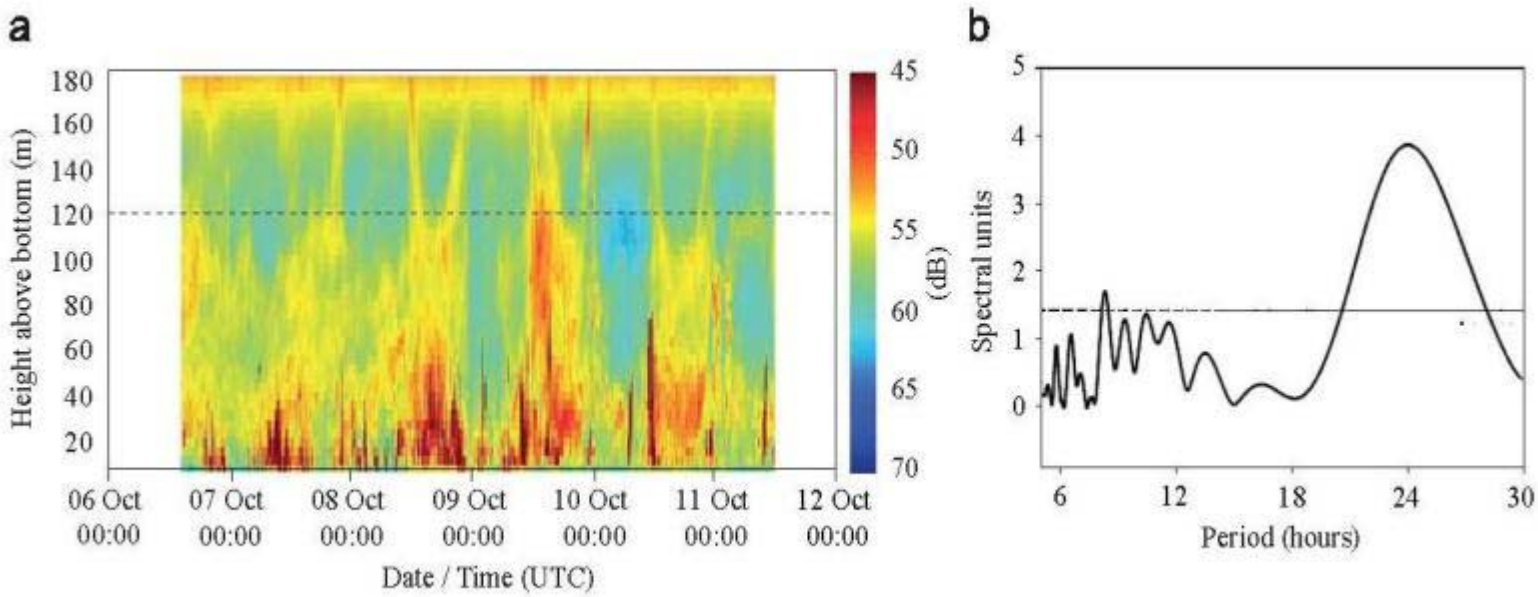







BOBO Lander 2008 – 2009
VK 826 NE
Temperature (°C)
Spawning
Spawning
Temperature (°C)
12
11
10
9
8
7
6
Oct
Nov
Dec
Jan
Feb
Mar
Mar
Apr
May
Jun
Jul
Aug
Sep
Month

Diel plankton migration



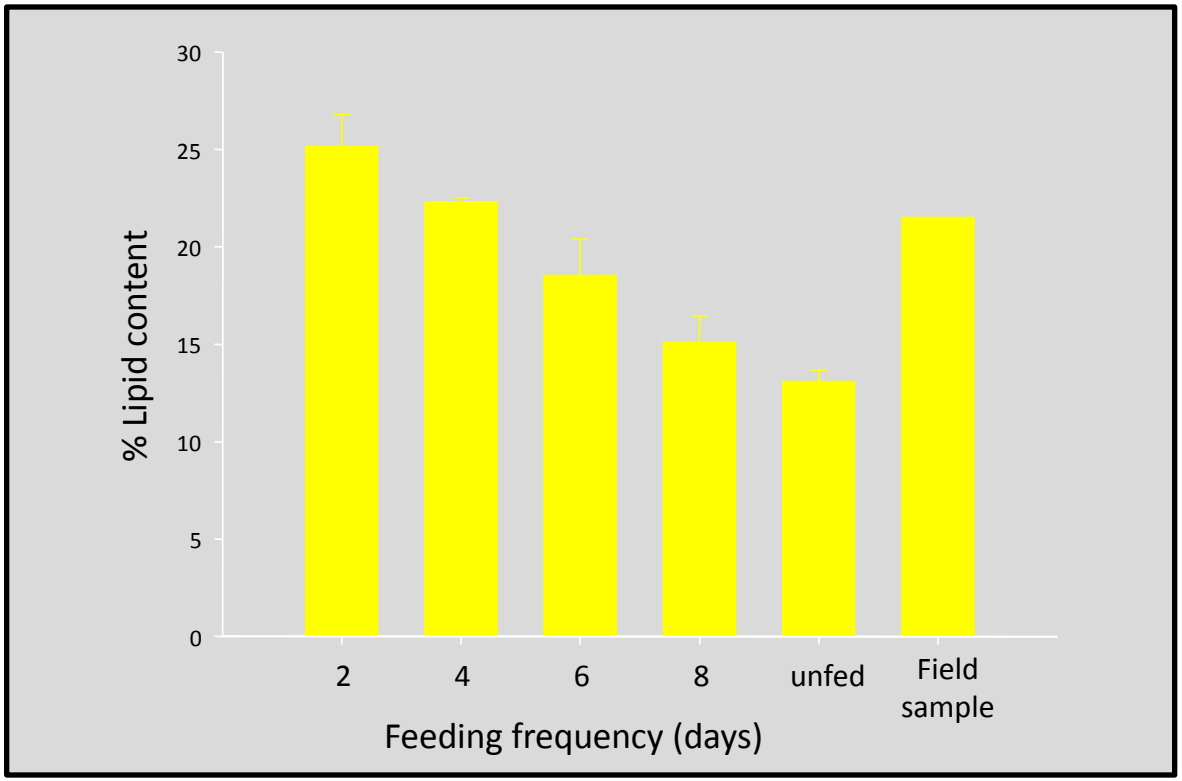
Upward looking ADCP from Albex lander (deployed within coral mounds) showed diel vertical migration of volume scattering strength (particles) between 100 – 180 m above the corals

Davies et al. 2010

Lipid content analysis

Decalcify corals and extract total lipid from multiple male and female colonies during different gametogenic periods

Correlate with monthly plankton data from sediment traps



% lipid of *L. pertusa* fragments fed different food rations over a one-month period. Field sample was collected from VK826 in Sept. 2005. Error bars: SE of n=2 trials

Reproduction in other coral species

Multiple samples of Leiopathes, Isididae, Primnoidae

These are being processed in the same way as Lp to define reproductive strategy and timing of gametogenesis

Samples from the Southeastern U.S. can supplement this data if the corals are on the same reproductive cycles.

Acknowledgments

U.S. Geological Survey for project funding

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Ship and sub crews of the R/V *Seward Johnson* and *JSL*

Reference

Davies, A.J., M. Wisshak, T.C.E. van Weering, F. Mienis, A.M. Quattrini, H.E. Seim, J..M. Bane, and S.W. Ross. 2010. Short-term environmental variability in cold-water coral habitat at Viosca Knoll, Gulf of Mexico. Deep-Sea Research I 57:199-212.