



Sit. Rep. #08
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US AMLR Vessel Survey (*R/V Yuzhmorgeologiya*)
South Shetlands, Antarctica

1. The *R/V Yuzhmorgeologiya* is currently about 6 nautical miles south of the Inaccessible Islands, a small group of islands on the western part of the South Orkney Islands, separated from Coronation Island by a deep canyon. The past week was spent investigating the western and northwestern shelf regions, down to 470 m. We have successfully completed 71 stations to date using a random depth stratified sampling design.
2. A total of 6790 Kg of finfish (26090 individuals) of 56 species have been captured and processed to date. Our greatest combined yields of finfish have been taken north of the Inaccessible Islands within the 150-250. The region of the shelf appears much more variable southern offshore areas of the South Orkney Islands have produced smaller yields of finfish per standardized area swept. Our greatest diversity of finfish species occurred at a station taken on the southwest slope at 750 m.
3. The largest finfish catch of the survey thus far remains the yellow notothenia (*Gobionotothen gibberifrons*) followed by the icefish *Chaenocephalus aceratus* and *Pseudochaenichthys georgianus*. Of particular note this past week was a large spawning aggregation of gray notothenia *Lepidonotothen squamifrons* encountered north of Inaccessible Islands. The spawning aggregation was also detected at the same time and location during the 1999 AMLR finfish survey of the South Orkney Islands.
4. Reproductive characteristics were investigated in the most abundant nototheniid and channichthyid species. The gonado – somatic index (GSI, gonad weight as a proportion of total body weight) was used to estimate the likely spawning season. February was the middle of the spawning season of the ubiquitous gray notothenia (*Lepidonotothen squamifrons*). Fecundity of the species is in the order of several hundred thousands eggs. Egg diameter is surprisingly small for an Antarctic species and hardly reaches 1 mm. Autumn/late autumn spawners are the icefish *Chaenocephalus aceratus*, *Pseudochaenichthys georgianus*, *Chionodraco rastrospinosus*, and *Cryodraco antarcticus*, and the nototheniids *Notothenia rossii*, *N. coriiceps*, and *Trematomus eulepidotus*. With the exception of *T. eulepidotus*, egg diameters of these species are 4.4 – 5.0 mm. *Champsocephalus gunnari*, *Lepidonotothen larseni* are winter spawners. Their egg diameter ranges from 2.0 – 3.5 mm. The ubiquitous *G. gibberifrons* reproduces in winter/early spring. Egg diameters are less than 2 mm.
5. The benthic invertebrate composition of the 25 stations conducted this week have been analysed for abundance and biomass of megafaunal bycatch. The greatest benthic

biomass encountered thus far this cruise was at Station 82, where 1.50 metric tons of invertebrate megafauna was caught, revealing an extensive demosponge community at this location. Station 60 was also notable for its long-established hexactinellid (glass) sponge and diverse primnoid gorgonian communities – both important VME-indicator taxa. Both of these stations are situated on the shelf off the south-west coast of Coronation Island.

6. All 3 benthic invertebrate specialists are photo-documenting live organisms, with the majority of specimens being vouchered for the Peabody Museum's collections. The highlight catch of the week was 4 giant aplacophorans – a poorly known group of mollusc – which may represent an undescribed species new to science. Aplacophorans normally measure around 1 cm in length, while these 4, brought up at Station 5 from a depth of ~470 m in an underwater canyon between Inaccessible and Coronation Islands, measured approximately 12 cm and serves as a good example of the tendency of Antarctica's invertebrate fauna to exhibit gigantism.

7. More than 700 specimens of 56 species of finfish have been sampled for phylogenetic studies and museum vouchers. Tissue biopsies were collected for genetic studies, and the specimens were fixed in formalin for deposition in the fish collection at the Peabody Museum of Natural History, Yale University. In the past week we have collected several rare notothenioid species including *Aethotaxis mitopteryx*, *Trematomus tokarevi*, *Vomeridens infuscipinnis*, and *Neopagetopsis ionah*. We have been measuring buoyancy and photographing these species. Specimens of *Notothenia coriiceps* and *Trematomus hansonii* have been a priority in our collections in order to investigate long standing unresolved questions in the taxonomy and systematics of these species.

8. Specimens of 43 benthic and planktonic invertebrates were preserved from a wide array of phyla as a small teaching collection for Florida Atlantic University. Five species of notothenioid fishes were also collected for FAU as teaching specimens.

9. A total of 757 finfish otoliths were collected this week, bringing total otolith collections to 2374, across 21 species. These otoliths are to be used in age estimation and stock assessment studies based at the Center for Quantitative Fisheries Ecology (CQFE), Old Dominion University (ODU), Norfolk, Virginia. In addition, otoliths and gonads for *C. aceratus* are being collected for examining age and growth, reproductive biology, and population structure of this species. Otoliths of *P. antarcticum*, *D. eleginoides*, *D. maswoni*, and *N. coriiceps* are being targeted towards the fulfillment of connectivity and population structure projects based at the CQFE. A total of 130 gonads (male and female, stages 1-3) have been collected from *C. aceratus* as of March 1. Gonads have also been collected from *C. gunnari*, *N. coriiceps*, *T. hansonii*, *P. antarcticum*, *L. larseni*, *T. nunesi*, *C. rastrospinosus*, *N. rossii*, and *L. squamifrons*. Total gonad collections for Leg II across all species thus far is 187. These gonads will be used in histological studies based at the CQFE and the CNR in Ancona, Italy.

10. A total of 266 finfish tissues for population genetic analyses along the Scotia Ridge were sampled through this week. This adds up to a total 869 notothenioid individuals sampled at the South Orkneys for this research. The amount of tissue collected for the

analyses of Expressed Sequence Tags doubled to the total of 18 species, each represented by at least two individuals.

11. Six IKMT net deployments were completed this week (17 to date). Catches ranged from zero to 4913. We have measured 668 krill to date. The mean length remains at 46 mm including measurements taken this week. Zooplankton specimens continue to be collected for E. Lazo-Wazum (primarily amphipods), J. Moore /M. Goebel/J. Gafney (adult fish), T. Near (larval fish) and N. Wilson (*Clione spp.*).

12. Krill NASC values were more variable relative to last weeks, though still relatively low. Highest concentrations of krill were found around station 5-67, near the mouth of the canyon separating the Inaccessible Islands from Coronation Islands. We also observed two krill factory trawlers actively fishing for krill in this region. NASC values range from 0 to 454.

13. The towed-ski camera/video configuration (Ski Monkey) that was constructed has resulted in a great increase in the quality and consistency of the still and video footage collected. An additional 7 stations were processed using the new configuration. The system has collected in excess of 10hours of High Definition bottom video footage as well as more than 1500 high resolution still images.

14. An additional 14 CTD stations were processed, bringing the total number of stations to 35. CTD operations were put on hold for one day due to heavy seas. Standard maintenance was carried out between dips.

15. Moderate Northerly winds averaging 15 knots, accompanied by a steady barometer hovering around 985 millibar, made for a calm start to the week with temperature averaging around 1 ° C. Tuesday saw the barometer drop sharply from 990 to 973 millibar resulting in Northerly winds in excess of 40 knots, producing 3-4 meter swells and forcing deck operations to be temporarily put on hold. Heavy seas continued through Wednesday and the wind speed decreased to an average of 20knots. Thursday through Sunday saw a gentle climb in air pressure with a further decrease in wind speed averaging around 8 knots resulting in calm seas accompanied by cold conditions averaging 0° C and occasional light snow falls.

Report submitted by AMLR researchers aboard the *R/V Yuzhmorgeologiya*, conducting surveys of the pelagic ecosystem in the peninsula region of the Antarctic. These reports are posted at <http://swfsc.noaa.gov/aerd-field.aspx>; blogs from the field are also posted at the same website. Photos by M. Goebel (NMFS/AERD).