



Southern California Association of Marine Invertebrate Taxonomists

December, 2004

SCAMIT Newsletter

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| SUBJECT: | B'03 Anemones |
| GUEST SPEAKER: | John Ljubenkov |
| DATE: | 14 March 2005 |
| TIME: | 9:30 a.m. to 3:30 p. m. |
| LOCATION: | Dancing Coyote Ranch (contact Megan Lilly for directions) |



The barnacle *Conchoderma virgatum* taken from near the surface on an oceanographic mooring off Palos Verdes in January 2005 (Photo John Miller, CSDLAC). The blue color is natural, not added, and was more intense when fresh.

6 DECEMBER MINUTES

This month's SCAMIT meeting was organized by Dean Pasko and hosted by the City of San Diego. The past Bight '03 project generated numerous new animals to discuss as well as the need for taxonomic resolution for many of the taxa in several crustacean groups. For this reason, four SCAMIT meetings have been scheduled between November 2004 and June 2005. This month's December meeting was the second in the series.

Kelvin opened the meeting at 9:10 am with the business end of things by reading off a list of the upcoming SCAMIT meetings. The 2005 SCAMIT topics can be accessed on the SCAMIT webpage: www.scamit.org. Currently the schedule has been flushed out through October of next year on a variety of taxa/ topics. If anyone would like to volunteer to present or host a meeting or be placed on the schedule for 2005, please contact Leslie Harris from the Natural History Museum of Los

Angeles County. If there is sufficient interest and need, arrangements can probably be made to accommodate more than one SCAMIT meeting per month. 2005 will continue a particularly busy schedule for SCAMIT that resulted from the Bight '03 sampling efforts and the great new animals and interesting taxonomic dilemmas they brought.

From here, the meeting ventured forward with discussion from Don Cadien on recent relevant literature. What a valuable and appreciated contribution! His literature review for this month follows the minutes in the newsletter.

The meeting at this time was turned over to Dean Pasko who mentioned that the City of San Diego would be acquiring a new 48 ft monitoring vessel from Monarch, scheduled for delivery in the spring of 2005. He then proceeded to give a summary on the City of San Diego's sediment mapping project (see below).

San Diego Sediment Mapping Study

Maps are often used to convey information to decision makers since they are easily displayed, self-explanatory, and give the viewer context over entire areas of interest. In addition, maps of environmental conditions at the same location over time can generate useful assessments of trends in spatial extent (e.g., is a problem growing or shrinking?). The need to create such maps with known levels of confidence for Southern California Bight (SCB) coastal areas was a primary recommendation of the Model Monitoring Program for Large Ocean Discharges in Southern California (Schiff et al., 2001). Consequently, in 2004 the City of San Diego (City) began a 2-phase "Sediment Mapping Study" of the coastal shelf off San Diego in collaboration with the Southern California Coastal Water Research Project (SCCWRP). Additional input into the study's design was provided by scientists from Colorado State University, the International Boundary and Water Commission (IBWC), the San Diego

Regional Water Quality Control Board (SDRWQCB), and the United States Environmental Protection Agency (USEPA). Although the program targets sediment quality primarily near the City's Point Loma Ocean Outfall and the joint City/IBWC South Bay Ocean Outfall, other areas of interest are also included (e.g., the LA-5 dredged materials disposal site). The impetus for the study arose from the need of the City, IBWC, SDRWQCB and USEPA to have scientifically defensible maps that define sediment conditions off San Diego. The entire project is expected to take about 54 months with completion of Phase 2 scheduled for June 2008.

The principal aim of the mapping project is to develop a general understanding of spatial variability off San Diego and to convey information on the spatial extent and magnitude of local environmental conditions to decision makers and the public. A broader goal is to provide sampling design guidelines that other SCB monitoring agencies can use to capture the necessary spatial information to construct defensible statistical maps of environmental conditions for their regions. More specifically, Phase 1 of the San Diego study has three primary objectives: 1) create variograms of spatial variance as a function of distance between two sites; 2) use variograms to establish the most efficient sampling density for creating maps (i.e., in Phase 2); and 3) use kriging techniques to generate maps of sediment chemistry and biological condition. Sampling for Phase 1 occurred in July and August 2004 with the collection of approximately 112 samples of both sediments and macrofauna from sites near the Point Loma outfall and about 107 samples from sites surrounding the South Bay outfall. These samples will be analyzed for grain size, total organic carbon, total nitrogen, trace metals, chlorinated pesticides, PCBs, and macrobenthic community structure. The data from Phase 1 will then be used to assess spatial variability and determine the optimal sampling distances that will be employed in Phase 2.



Phase 2 sampling is scheduled for the summer of 2006, and these data will be analyzed to create specific maps with known levels of confidence for various parameters. For further information on the San Diego Sediment Mapping Study, interested individuals should contact Tim Stebbins at the City (tstebbins@sandiego.gov) or Ken Schiff at SCCWRP (kens@sccwrp.org).

With official business complete, we began our second installment of the four part Crustacea series. Our first topic was the amphipod genus *Americhelidium*. This has been an extremely difficult group due to a variety of plastic characters that make identification to species level almost impossible. However, it didn't start out that way. When SCAMIT was a new organization this genus was known as *Synchelidium*. Members reported two nominate species, *S. rectipalmum* Mills 1962 and *S. shoemakeri* Mills 1962. They were relatively easy to distinguish based on configuration of the G1 palm. We were also aware that there were other undescribed forms present in our area, and that Dr. J. L. Barnard (Smithsonian) was working on them. He eventually described a third species, *S. micropleon* (J. L. Barnard 1977), from intertidal sands in southern California. Unfortunately, Jerry Barnard eventually threw up his hands and stopped working on the group. He passed on a partial manuscript dealing with the still undescribed forms he had separated from the voluminous AHF material. He wished well to whoever chose to take up the group, and walked away.

The challenge was not taken up locally or immediately. Things remained the same until publication of the first portion of a multi-part review of North East Pacific oedicerotids by Bousfield and Chevrier (1996). Their treatment was based mainly on collections made in the temperate and boreal regions of the western U. S. and Canada. Little material, if any, was examined from below Point Conception. *Americhelidium* n. gen. was erected to contain all described species of "*Synchelidium*" from

the North Pacific and the American coast of the Atlantic, restricting *Synchelidium* to European waters. Four new species in *Americhelidium* were also described: *millsi*, *pectinatum*, *variabilum*, and *setosum*; and existing species allocated to the new genus were discussed.

Initially we thought some of these might be among the forms diagnosed in the Barnard manuscript, but this proved a vain hope. There was not enough relevant detail in the MS to allow any of Barnard's names to be recognized among the newly described forms (other than *A. micropleon*, which he had published earlier).

The trouble was that while many characters of southern California specimens matched the new species described from Western Canada, no local specimens matched all characters of any one species. This led to a brief flurry of erecting local provisional *Americhelidium*, all but a few of which have fallen into disuse because the characters used appear to be too variable for reliable application of the provisional names or the names of those species described from other areas.

General practice has been to leave animals not clearly referable to either *A. rectipalmum* or *A. micropleon* at *Americhelidium* sp. Dean Pasko however, has recognized a new *Americhelidium* species that can be easily distinguished from the remaining problematic group. A voucher sheet was passed around and reviewed with agreement from everyone that this was indeed a taxon that could be identified to species level and was sufficiently different than what is currently known from southern California. The characters that help distinguish this species are the following: the outer plate on the maxilla of *A. sp SD1* is unique, with 10–12 simple teeth compared to other species of the "*shoemakeri*" group that have only 5–6 simple teeth or multi-cusp teeth as found in *Americhelidium pectinatum*. Eric Nestler presented ecological data comparing depth and sediment distributions for *A. sp SD1* and specimens identified as *A. shoemakeri*. Both



species overlapped in shallower depths, however, *A. shoemakeri* notably extended beyond *A. sp* SD1 into deeper waters (100m or more). Dean mentioned that he would like to add additional mouthpart characters for *A. sp* SD1 and will be modifying the circulated voucher sheet for posting to the SCAMIT website (Taxonomic Tools section) sometime soon.

There still remained no resolution for reliably identifying other known *Americhelidium* taxa. After much discussion, the group decided that the best way to resolve this problem, for now, is to refer to this group as “*Americhelidium shoemakeri* CMPLX”, excluding Dean’s new species *Americhelidium sp* SD1. This would allow Dean’s new species to be pulled out for the purposes of resolving its habitat preferences and also standardize among agencies how the rest of the *Americhelidium* group is reported. The recognized and differentiable species *A. rectipalmum* and *A. micropleon* are not included in the complex.

Another new species brought to our attention was *Pachychelum sp* SD1, recognized by Dean. A voucher sheet was again distributed and discussed. This will be another amphipod species for us all to keep a look out for.

The next little beast that Dean brought forward was the amphipod Lysianassidae sp SD1. This proved to be a most challenging animal and required most of the morning to come to some sort of consensus. Dean had difficulty assigning the 2.5 millimeter adult male to a genus and was not even confident that he had assigned it to the proper family. His initial efforts led him to think that this animal might belong to the genus *Socarnopsis*, however, gnathopod 2 was not “minutely chelate” and did not really correspond to that description. Everyone gathered to take a glimpse of the unusual animal and much effort was put forth in rigorously searching the literature for some sort of match with consensus going back and forth regarding its placement in the

Lysianassidae. The animal was finally run through a family key to amphipods posted on www.crustacea.net. Through this analysis, the animal keyed out to indeed be a member of the Lysianassidae. Shortly afterward though, under further examination by Eric Nestler, it was realized that one of the characters had initially been misinterpreted. The length of the ishium on gnathopod 2 was short! This was not concordant with one of the diagnostic characters of Lysianassidae, an elongate ishium! At this point, we all agreed that the animal did not match any known amphipod family and may belong to a new family, yet to be described. Other characters that supported the exclusion of membership to the Lysianassidae were the lack of an accessory flagellum on antenna 1 and the presence of a rather large rostrum, not typical of that group. Additionally the morphology of a subchelate palm and dactyl with deeply incised tip forming a long slender tooth, and a subsequent smaller tooth located just beneath that, was highly unusual. Three to four large bi-fid spines protruded from the anterior face of the propodus and a large process at the base of the dactyl was obvious. These interesting aspects of G2 led to a reexamination of gnathopod 1. The propodus and dactyl configuration on this appendage were also found to be extremely interesting. A large spine projected proximally from the propodus and formed a scissor like combination in conjunction with the dactyl. This pincher morphology proved to be rather ornate with complex setae protruding from the dactyl and four nodules present along the distal end near the tip.

Upon further reflection and examination of Barnard & Karaman (1991) and Gurjanova (1951), Don Cadien suggested that the beast might turn out to be an iphimiid. It seems particularly close to the group containing *Odius*, which was separated off into its own family, the Odiidae. P. G. Moore (1992) treated these in the NEP in a paper on stegocephaloids. He described two new taxa from our waters, an *Odius* and one in a new genus *Imbrexodius*.



Don recommended that Dean compare his specimen with *Imbrexodius oclairi* Moore 1992. None of the existing genera seem to have quite the same structure on gnathopod 1 as this peculiar little guy, however, and a new genus may prove necessary. Unfortunately, more material and larger specimens are needed before that can happen, and this specimen will have to remain a SCAMIT provisional taxon! The beast was collected from 75m near Anacapa Island. Several images were captured during the meeting and an updated voucher sheet with these images will soon be posted to the Taxonomic Tools section.

By this time Scott Harrison from Scripps Institute of Oceanography had arrived to give his presentation “Phylogeny and Biogeography of *Pinnixa*”. Scott had previously worked under Mary Wicksten for his PhD and is currently completing a second post-doc at SCRIPPS, continuing his work on Pinnixid crabs as well as investigating the sensational genetic variability that exists for the copepod *Tigriopus californicus* up and down the coast of North America.

Scott’s talk on the phylogeography of Pinnixids reviewed various evolutionary strategies found among members of this group related to geography. His initial studies on the *Pinnixa cristata* complex (now *Austinixa*) in the Gulf of Mexico and western North Atlantic, showed that vicariance was the major cause of speciation. In the cladogram, most species were separated by long branches, reflecting well-established lineages with significant genetic modifications. Having demonstrated this he wondered if other species groups of pinnotherids might not reveal other mechanisms of speciation. He decided to test the North East Pacific species of *Pinnixa* next. All members of the *Austinixa* group were associated with callianassid shrimp, but the *Pinnixa* utilize a broad spectrum of hosts. Initial run results showed much shorter branches for the *Pinnixa* group, and a prominent separation based on hosts. All tested

pinnotherids came out very close together, reflecting recent origin and only limited genetic modification. This included *Scleroplax granulatus*, which fell out in the cladogram within the *Pinnixa* cluster. This would suggest that the differentiation of the two genera has no basis, and argue for a movement of *S. granulatus* back into *Pinnixa*. The upshot of Scott’s results was that the speciation mechanism in the *Pinnixa* group seemed to be host shift rather than vicariance. This sort of a difference was what Scott had hoped to find. It seems to make good ecological sense given the nature of commensal/host relations in the two clades.

During the Bight ’03 Synoptic Data Review meeting, Dean called into question the validity of *Pinnixa scamit*, stating that he believed this was most likely the same thing as *Pinnixa occidentalis*. The statement surprised Lisa Haney, noting the obvious ratio differences described in pereopod 4 for each species. Lisa and Dean both sent representative samples of each species to Scott for a genetic comparison. Upon finishing his talk, Scott informed us of these results. He only had time to run gels on the specimens that Lisa had sent and used the primer sequence for 16S. These results showed that both taxa had identical sequences, suggesting that the two might actually be the same species. Scott mentioned that he would like to do some further work on this and use the Cytochrome B gene to determine if there might be more recent divergence that would not be detected with the use of 16S. We await his analysis. If the two taxa indeed prove to be the same species, a short note will need to be published and *Pinnixa scamit* would then become a synonym of *P. occidentalis*.

It was decided that we would skip the amphipod group Phoxocephalidae, as well as the Ostracods and Pycnogonid groups, since we were running low on time. All three groups will be postponed to the fourth crustacean SCAMIT meeting scheduled for June 2005.



The meeting continued with a PowerPoint Presentation by Don and Lisa on Gnathid Isopods and the taxonomic tools they found for linking females with males.

A handout was distributed covering the topic addressed in the presentation, and giving more details (accessible as a Taxonomic Tool on the SCAMIT website). The presentation dealt with the two local *Caecognathia* species. Connections were also drawn between praniza larvae, females, and males of one of the two, *Caecognathia crenulatifrons*. The basics of gnathiid development were revisited (two larval forms: zuphea, which upon feeding becomes a praniza, which then moults into another zuphea). Three cycles of this zuphea to praniza change were documented for one local species, and photographs were shown of each of the six larval forms (zuphea cycle 1, 2, and 3, and praniza cycle 1, 2, and 3). The additional intermediate male moult which occurs between praniza cycle 3 and adult male was also shown. Photographs of both sexes of each of the *Caecognathia* species (*crenulatifrons* and *sanctaecrucis*) as well as an undescribed *Gnathia* from off Oregon were shown. Morphological details allowing the various morphs of each species were discussed and demonstrated. The hope is that examination of further material will allow similar connections to be established for the remaining six gnathiid species known from the North East Pacific. We also examined males of several other species of gnathiids (*G. tridens*, *G. productitridens*, *G. trilobata*) from the collections of the San Diego Lab.

Remaining on the topic of isopods, Dean presented *Munnogonium* sp SD1. This animal looked very much like *Munnogonium tillerae* but was much smaller in size and lacked any evidence of eye structures at 40X magnification. Dean provided a preliminary voucher sheet listing additional character differences, such as pereopod 1 with oblique palm, P2 with dactyl sub-equal to propod and

basis not enlarged. Don Cadien suggested that this animal strongly resembled *M. tillerae* except in being blind, and recommended more investigation before reaching a conclusion.

Dean then brought out another isopod specimen he labeled *Asellota* sp SD1. Don immediately recognized this as being very similar to *Paramunna quadratifrons*. It differed in the shape of the frons, lacking the quadrate angles, but was clearly, closely related. Everyone agreed that this was definitely a *Paramunna* and should be recognized as *Paramunna* sp SD1. A preliminary voucher sheet was also passed around for this animal, but we look forward to an updated version soon. If prepared as a SCAMIT animal this would be *Paramunna* sp B, as *P. sp A* of SCAMIT already exists.

At this point, Eric brought up the topic of hermit crabs stating that 122 *Pagrus hartae* were found in an individual sample during the Bight '03 survey. Formerly this taxon had been referred to as *Parapaguruodes hartae*. A recent publication transferred this species to the genus *Pagurus* (McLaughlin & Asakura 2004). Eric suggested that the Haig hermit crab key be redone and updated taxonomically to reflect current nomenclature. Hermit crabs continue to be a difficult group and an updated key would be highly beneficial. Is anyone volunteering to take on this challenge? Don? Eric?

The last topic of the day was Cumaceans. Eric presented *Cumella* nr. *californiensis*. He mentioned the lack of exopods on any of the female pereopods and that without this character it did not fall within the diagnosis of the genus *Cumella*. Upon further research, it was determined that this specimen belonged to the genus *Elassocumella* created by Watling (1991) for another species lacking exopods in the female, and should therefore be recognized as *Elassocumella* sp SD1 Nestler 2004§.



Dean then brought out another unrecognized *Cumella*, *Cumella* sp, with no associated voucher sheet. This was another interesting find from Anacapa Island collected as part of the Bight '03 effort. Don agreed that it was a new species of *Cumella* but would leave it in Dean's hands to be described. It was already 3:30 and time for people to get back on the road.

All in all, it was a great meeting. Some things were resolved, others need further investigation. The next crustacean meeting will be in February, 2005, where a review of Corophoidae nomenclature will take place with John Chapman (Hatfield Marine Science Center, Oregon) as our special guest. We hope to see all the same smiling faces and more.

NEP PLEUSTID AMPHIPODS D. Cadien CSDLAC

Over the past decade a significant series of papers has greatly increased our knowledge of the pleustid fauna of the Northeast Pacific, Northwest Pacific, and arctic coasts of Asia and North America. These have come from workers examining material collected in Canada who reviewed previous reports and collections of pleustids from further west and further south. Two major papers in 1994 (Bousfield & Hendrycks 1994a, b) initiated the series, followed fairly closely by Bousfield & Hendrycks 1995. Ill health of the senior author intervened, and it wasn't until earlier this year that their treatment and comprehensive review of the family could be completed (Hendrycks & Bousfield 2004).

Because these treatments have resulted in description of many new species of pleustids I thought it necessary to put them all together and produce a hierarchical list of pleustids from the NEP including their additions and revisions. In a few cases species from the Arctic or East coast of North America have

been inadvertently retained on this list. Many of the taxa are only found well outside the coverage area of SCAMIT, but all reported from the NEP have been retained.

I encourage all amphipod workers to review this list. You may find that some of the nomenclature in your data has been rendered invalid by recent actions. Take your time, we won't be discussing this family until at least June 2005, if then. The changes will be reflected in the next (5th) edition of the SCAMIT Taxa List. If you disagree with any of the actions taken by Bousfield and Hendrycks in these papers, please contact Don Cadien (dcadrien@lacsdsd.org) and argue your point of view. The list is appended to this Newsletter, and was distributed to participants in the 6 December 2004 SCAMIT meeting on Crustacea.

NEW LITERATURE

Invasive species have a variety of experiences during their attempts at insinuating themselves into an ecosystem. In some cases they are able to take advantage of an existing situation to co-opt an open niche (as with *Philine auriformis* on our coast), in others they just force their way in like *Caulerpa taxifolia* in the Mediterranean. Rilov et al (2004) relate a very different history for a Lessepsian migrant invasive mussel in the eastern Mediterranean. The species was first detected in the Mediterranean in 1876, seven years after the opening of the Suez Canal. It very slowly spread north and westward along the coast, reaching Sicily by 1970. During this century it remained rare, although its spread indicated a tenuous toe-hold in the Mediterranean ecosystem. During the 1990's a change in vermetid populations of subtidal platforms off the Israeli coast allowed dense beds of the invasive *Brachidontes pharaonis* to become established where no mussel beds had existed previously. Once this occurred the species was able to invade more competitively dominated intertidal situations by larval swamping of the



indigenous species. The authors document this latter rapid shifting in dominance over a four year period. Thus, the preceding slow spread and accumulation of *B. pharaonis* prepared it to react decisively as a strongly invasive form once the right conditions were presented. A most interesting invasion scenario; sort of a paranoid's "sleeper-cell" attack from within approach. Invasion dynamics are multifaceted, and deserve some prolonged contemplation by us all.

The sponge family Clionidae (now emended to Clionaidae to relieve a homonymy problem with the pteropod mollusk family Clionidae) has traditionally consisted of species which bore or excavate calcareous structure. This was revised to include other forms of non-excavating massive sponges which shared a unique fatty acid with more traditional boring members (Vicente et al 1991). Later cladistic analysis (Rosell & Uriz, 1997; Rützler 2002) reallocated some species, and reestablished the family Spirastrellidae, which had been subsumed within Clionaidae by Vicente et al. Carballo et al (2004) examine the clionaid fauna of the Pacific coast of Mexico, and describe several new species. They also treat *Speciospongia* as a clionaid as a result of the above revisions. While we shouldn't expect most of these species in our area, they may show up during ENSO periods, and are worth watching for.

Opisthobranch mollusks are an exceedingly diverse group. Wägele (2004) presents and discusses the impact of a series of potential key innovations in the evolution of the group. She considers 1) acquisition of cuticular gizzard plates in Cephalaspidea, 2) kleptoplasty in Saccoglossa, 3) kleptocnidy in aeolids, 4) algal symbiosis in the aeolid *Phyllodesmium*, and 5) mantle structure in chromodorids, are all mentioned. Such key innovations have served as the spurs to rapid radiation and speciation for the group in the author's opinion.

Taxonomists are perennially declining in number and availability as so few are produced by our educational and employment systems. Their services are in demand, and full taxonomic analysis of environmental samples doesn't come cheap. In consequence, regulators and program managers are always seeking alternatives to full analysis. One fairly new wrinkle is selection of a single "surrogate" group to serve instead of full community analysis. Olsgard and Somerfield (2000) suggest that polychaete worms are the appropriate surrogate in point-source pollution investigations. They do, however, recommend that the complete community be analyzed to create a baseline for comparison with surrogate monitoring information. Olsgard et al (2003) extend the surrogate concept into rapid-assessment methodology for conservation biology, touting the Terebellida as particularly useful as a subset of polychaetes reflecting trends in all polychaetes and in marine communities as a whole. I feel that use of surrogates, as was the case with identification to Family or higher level only, creates an unacceptable level of information loss. As a non-polychaete worker I have an innate bias against such suggestions, but the authors' analysis should be evaluated to determine if it offers something of interest.

A number of papers in recent years have dealt with the production of halogenated compounds by marine worms as a defense mechanism. Efficacy of such attempts is usually not seriously evaluated. Kicklighter et al (2004) evaluate whether production of brominated compounds confers some defense from predation in 16 species of "worms". Only the enteropneust, *Saccoglossus kowalevskii*, was found to be unpalatable to fish and crab predators. Production and release of brominated compounds may, however, be more directed at competitors than predators, and has been shown in some instances to be effective at controlling behavior of settling larvae around a bromine producing organism.



While we are often concerned with local patterns of biodiversity as indicators of ecosystem health around point-source discharges, we tend to ignore the larger scale patterns of biodiversity. Gage et al (2004) examine the pattern in the cumaceans of the Atlantic at the largest scale: for the entire Atlantic Ocean. One of the major problems of large-scale examinations is taxonomic standardization of the disparate sources included. This was not an issue with their examination as all the samples used in the analysis were identified by Norman Jones prior to his death. Gage and co-authors provide the analysis which Jones had in progress but was unable to finish. They compare their results with other examinations of diversity patterns in the Atlantic using other taxonomic groups. Available cumacean data clearly validates earlier findings that the deep water fauna of the Nordic Seas is impoverished relative to other Atlantic regions.

The mysids, or opossum shrimp, have received little attention with regard to their genetic sequencing and phylogeny. Remerie et al (2004) perform an analysis based on 18S ribosomal RNA sequences from 25 species of mysids. Their results demonstrate that all is not well in mysid morphology based taxonomy. This is particularly true within the subfamily Mysinae within the Mysidae. The current analysis indicates that the Mysinae resolve into three monophyletic groups, one corresponding fairly closely to the Leptomysini and the other two as yet unnamed. The subfamilies Siriellinae and Gastrosaccinae appear to be monophyletic. A more diverse taxon sampling utilizing data from other mysid families and from more taxa within the Mysidae may provide better resolution in the future. The subfamily Mysinae, however, seems clearly polyphyletic based on current analysis.

We have only one species of the amphipod genus *Cymadusa* present in local waters, *Cymadusa uncinata*, the kelp curler. Peart (2004) revises a related group within the genus

without directly addressing any issues related to *C. uncinata*. Her analysis is of considerable value to us as a demonstration of character variability within the genus, and should be consulted with that in mind.

Greg Jensen (2004) revisits the reported variability of the hippolytid shrimp *Eualus pusiolus* and decides that there is more than one species confused under that name. He erects a new species, *Eualus butleri*, previously confused with *E. pusiolus*. He reports this new species to be found with hexactinellid sponges *Rhabdocalyptus dawsoni* and *Aphrocallistes vastus*, both of which occur within the Southern California Bight. Previous reports of *E. pusiolus* in this association reflect misidentified *E. butleri*. *Eualus pusiolus* is free-living on sand, clay, calcareous or algal bottoms. The two differ morphologically as well, and are clearly separable in a revised key to Eastern Pacific members of the genus provided by the author. The total number of hippolytid species in the area remains constant as Stamatiou and Jensen (2004) reduce *Heptacarpus littoralis* to a synonym of *H. sitchensis*.

ONBOARD THE RV ATLANTIS

In the last newsletter the minutes discussed Cheryl Brantley's and Todd Haney's presentations of their recent experiences with deep sea investigations off the RV Atlantis. Dr. Jody Martin (NHMLAC) was also along and sent back a series of e-mail "postcards" which described activities aboard the vessel. They are reproduced below, with his permission, and give a personal view to augment the minutes.

No. 1 – 30 Aug04

Hi everyone,

Todd Haney and I are aboard the Atlantis, the mother ship for the deep submergence vehicle (DSV) Alvin. This expedition is being led by Dr. Janet Voight, a curator at the Field Museum, and it is funded by a grant from the National Science Foundation to study the diversity of deep-sea life.



We flew up on Thursday to the Seattle Airport and took a bus the next morning (Friday) down to Astoria, Oregon, a scenic fishing town (OK, I am sure it used to be more scenic than it is now, but it is still pretty despite being a bit touristy now) on the Columbia River. The Columbia River is huge and impressive, but fortunately it was not that turbulent when we left, which is a good thing for those of us who get a little seasick just taking a bath (yes, it's true, even marine biologists can get amazingly seasick, and I am one of the worst).

We boarded the Atlantis Friday night, and it left port on Saturday morning, crossing the bar at the mouth of the Columbia River, one of my biggest worries for the entire trip, at about 9:30. But as I said above, it was pretty calm. We have been steadily heading out to sea since, with the exception of one stop to deploy a CTD device (which measures conductivity, temperature, and depth, and collects water samples at various depths, among other neat tricks) for scientists from the University of Washington.

Our first Alvin dive is tomorrow (Monday) at 8:00 am, and I am scheduled for that dive, weather permitting. Todd is scheduled for a dive later in the week. Tomorrow's dive is on the Gorda Ridge, and our primary mission is to locate some wood blocks that were placed here in 2002 to see what kinds of organisms would colonize them. The blocks are approximately 50 meters north of a hydrothermal vent that is characterized by small colonies of tube worms (mostly in the genus *Ridgeia*, I think). Lots of invertebrates are attracted to wood in the deep sea, and we are anticipating a lot of worms, snails, and (I hope) small crustaceans. The depth of this first dive will be at 3220 meters when we first land on the bottom, increasing to 3250 meters later in the dive when we visit other areas of the ridge. We will be using a suction arm on the DSV Alvin to "vacuum" small invertebrates from beneath the wood blocks, and then we will use the Alvin's claw arm to pick up the blocks and put them in the

basket on the front of the sub. If, of course, we can find the blocks. After two years, it is very possible that sediments will have covered everything.

If any of you have questions, or need to ask me something, that's fine, but please keep it fairly short - I am charged for all incoming and outgoing e-mail messages, and the longer ones cost more. And no attachments please (the ship will reject them). I hope everything is going well there. With all best wishes,

- Jody Martin

No. 2 — 31 Aug04

Hi everyone,

I am writing this on Tuesday, August 31, but because the ship sends out e-mail only three times daily you probably will not be reading this until Wednesday morning.

The first Alvin dive was extremely successful. We were diving in the Escanaba Trough region of the Gorda Ridge, and our maximum depth was 3258 meters. (Definitely a depth record for me, since my previous SCUBA record was somewhere in the vicinity of 40 meters or so!). Janet Voight of the Field Museum was the port-side observer, and I was the starboard side observer. Our pilot was Anthony Tarantino.

Our main objective on this dive was to retrieve some samples of wood that had been placed here roughly 2 years ago. It is known that animals are attracted to wood in the deep sea, and one hypothesis is that as the wood begins to decay, it might attract the same guild of deep-sea creatures that are found at hydrothermal vents, which are also reducing environments. If so, pieces of waterlogged wood could serve as potential "stepping stones" for vent organisms.

It took us 2 hours to reach bottom. Then we sat there for another hour while the mother ship Atlantis took readings to better ascertain where we were, so that they could then give us more exact coordinates for reaching our target area. Thus, although our dive began at 8:00 am, we



did not really move off the sea floor until around 11:00. We had landed only about 57 meters away from the wood targets, and found them rather easily. This in itself is a neat trick, as from the small windows of the sub, it is very hard to get your bearings, and the sea floor all begins to look the same. The wood had been marked with floating markers (large pieces of white plastic), making the job a little easier. Our pilot did an amazing job of navigating. The wood was also still in a mesh bag (somewhat reminiscent of how we used nylon bags to enclose the ARMS structures in the Caribbean) to retain associated organisms.

The pieces of wood (both oak and pine, to see what effect the hardness of the wood might have on colonization and decay at this depth) were picked up using Alvin's mechanical claw arm, operated quite skillfully by the pilot (Anthony). These were loaded into the "bio-boxes" on the front platform of the Alvin. Then we used the suction arm of the Alvin to more or less vacuum up the dark sediment that was under the blocks, on the assumption that the organic matter of the blocks might attract small invertebrates that would hang out under the wood. After doing this, we took off to find and observe the actual vents themselves, about 24 meters away.

It is hard to describe the feeling of looking out the tiny window of the Alvin and seeing actual hydrothermal venting just a few feet away. We took some still photos and video footage, and I will hope to be able to show some of these images after I return. These were relatively low temperature diffuse vents (our highest recorded temperature was around 215 degrees C) compared to higher temperatures sometimes found at chimney vents far to the south. We took some temperature measurements, and grabbed a small sample of the tube worms (genus *Ridgeia*) and made a few more collections (mostly anemones) using the arm of the Alvin.

We also used 6 "push cores," which consists of Alvin's arm picking up a push core device from the front of the platform and sticking it into the nearby sediment, then pulling it out and loading it back into its holster on the Alvin's front platform.

By the time we had completed those small tasks, it was around 3:00 in the afternoon. A 2-hour transit back to the surface would get us back to the Atlantis by 5:00 pm, so we had to depart. Time goes very quickly when you are in the submarine, unfortunately.

Upon the return we unloaded the samples and spent most of the evening sorting and identifying them, until midnight or so. I was particularly tired - probably a combination of being hunched over in a 7-foot diameter steel sphere with two other people for 9 hours, plus the combination of high CO₂ and low oxygen (they keep the Alvin at only 16-17% oxygen to reduce the risk of fire on the sub) combined with adrenalin and caffeine. At any rate I am pretty worthless today.

Meg Daly (an anemone expert from Ohio State) and Jim McClain (a geo-physicist from UC Davis) are in Alvin today, and we will be expecting their arrival (with more specimens to sort) at about 5:00 pm. In the meantime, Todd and I and most of the other scientists are still working on the samples brought up yesterday. All for now - I will hope to write more tomorrow. Best wishes to everyone there,
- Jody

No. 3 — 2 Sept04

Hi everyone,

I have lost track of the messages that I have sent from the ship, but I think this is the fourth. Yesterday (Wednesday) was a transit day in order for us to reach the Juan de Fuca Ridge. Today the chief scientist (Janet Voight) dived in Alvin with a graduate student from Canada in an area called the Endeavour Segment of the Juan de Fuca Ridge. The depth of the hydrothermal vent field here is roughly 2400 m, much shallower than the original dive on



the Gorda Ridge. The Endeavour Segment has enormous chimneys, some as high as 45 meters, to the extent that remotely operated vehicles do not like to dive here, as there is a good chance of tangling their communication cable on one of these giant towers. But for Alvin it is much easier, since there are no cables connecting the sub to the mother ship. Some of the vents on these gigantic towers are spewing water as hot as 300 degrees (C), as compared to the relatively low heat and diffuse vents at Gorda.

Here, as with the other sites, our primary mission is to gather blocks of wood that were set out about 2 years ago to see what colonizes them. Interestingly, we are seeing a very different fauna here from what we saw on Gorda Ridge. The new genus and species of leptostracan that Todd was hoping to find is here (we did not find it at the previous 2 sites), and so he is able to increase the number of specimens (before this trip there were only 4 known individuals). Many of the deep-sea beasts are very strange looking, and much of our time is spent trying to figure out what some of these things are.

In addition to gathering wood, we are also using a variety of collecting devices. Alvin has two "claw arms," and using these we can sample with push cores, plankton tows, suction arms, and other devices, and of course Alvin can also just grab things with its claw (though delicate organisms do not fare too well that way). On today's dive, they captured one seep-sea octopus (Janet's specialty group) and several anemones, in addition to locating and loading the wood set out 2 years ago.

Tomorrow (Friday) is our fourth and last dive. Todd will be on Alvin, along with a postdoc from Texas A & M (and the Alvin pilot, of course). Sometime late tomorrow night, we should begin the long haul back toward Seattle, which we hope to reach by late Saturday afternoon. With all best wishes,

- Jody

No. 4 —3Sept04

Hi everyone,

The last Alvin dive was today. Todd was the port-side observer, and Kim Larsen (from Texas A & M, and a fellow crustacean biologist) was the starboard-side observer. The pilot was Bruce Strickrott. One of the exciting aspects of today's dive was that Todd was allowed to actually drive the Alvin around (he and Bruce switched places for a while), a really rare and wonderful experience.

Today's dive was interesting for several reasons. First, it was on a low elevation seamount, but it was not associated with any hydrothermal venting. The location of the seamount, for those of you who would like to look it up on a map, is: 47° 47.08713'N 127° 41.47649'W and the depth was 2,656 meters.

The seafloor here is not that interesting compared to some of the other sites — mostly just lots and lots of sediment, with very few landmarks. Four packets of wood had been placed here in 2002, and the concern was that it would be quite challenging to locate them again, with such a flat and relatively uniform seafloor. Fortunately, the Alvin located the wood almost as soon as they reached bottom, at around 10:30 am. That left the Alvin free to scout around and pick up assorted creatures at will, which they did. In fact, they came back early because they had loaded all of Alvin's containers with either wood or creatures, and they surfaced at about 4:15pm. They had filled all 6 of the push core devices (some of which they turned sideways and used as long scoops to get more animals from the first few inches of the sediment), all of the bio-boxes (these are large crates with lids on the front platform of Alvin), the pelagic and suction sampling devices, and the plankton net as well. Collecting anything more would mean opening a biobox to put it in, and each time they tried to do that, one of the swimming sea cucumbers would swim out of the box, so finally they just called it a (very productive) day.



All told, they collected an interesting assortment of anemones, sea cucumbers, sea stars, and other creatures, and of course there were also the animals collected along with the wood blocks, so we will be sorting and preserving specimens into the night.

Because this was the last dive of this cruise, after the specimens and people had been removed from all of the collecting devices of the Alvin, we stripped the outer fiberglass “skin” off of the Alvin and hosed everything down. They do this anytime that the Alvin is going to sit for a while (it will be 6 weeks until it dives again) to be sure to get all of the seawater out of every place where water could accumulate. Beneath the plain white skin of the sub, it is an amazingly complex machine, as every part of it has to be able to withstand pressures equivalent to a depth of 4,000 meters. Thus, all cables are filled with liquids so that nothing can be compressed, all electronics have to be sealed in oil-filled cases, and so on. It truly looks like something from outer space.

This will be the last message from us in the field, since it is now Friday evening, and so anything further that I write would not reach you until Tuesday anyhow (with the Monday

holiday). And from this point on, our trip should be uneventful. We have about 24 hours ahead of us to reach Seattle, and another several hours of cleaning up and packing out once we get there. We will stay on Atlantis one last night and then catch a taxi early on Sunday morning for our flight back to LA.

I hope you have enjoyed hearing about the expedition as much as we have enjoyed taking part in it (and I apologize for overloading the mailboxes of those of you who are not interested). This sort of large-scale, ship-based collecting is logistically complicated and very expensive, and it is a pleasure to be part of such a well-organized trip. Every objective of every dive was met, spectacular collections were made, and nobody was injured.

Because of the Field Museum’s clear commitment to the expansion and upgrading of their collection space and the growth of the collections themselves, they have laid the groundwork for further grants of this scale, and it will be interesting to see where they go from here. I look forward to seeing you on Tuesday! With all best wishes,

- Jody

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SCAMIT

C/O The Natural History Museum, Invertebrate Zoology

attn: Leslie Harris

900 Exposition Boulevard

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pleustidsrevised

Revised composition of the family Pleustidae in the Northern Pacific
including revisions through 2004 (B & Hendrycks 1994a & b,
1995, Hendrycks & Bousfield 2004) dbc 26Apr04

Subfamily **Gen Sp** Synonyms

Atylopsinae

Myzotarsa

anaxiphilius Cadien & Martin 1999

Stenopleustinae

Stenopleustes

malmgreni (Boeck 1861)

Amphithopsis malmgreni Boeck 1861

eldingi Gurjanova 1930

latipes (M. Sars 1858)

Amphithoe latipes M. Sars 1858

nodifer G. O. Sars 1893

olriki (Hansen 1887)

Amphithopsis olriki Hansen 1887

Arctopleustes

ramyslovi (Gurjanova 1951)

glabricauda (Dunbar 1954)

Gracilipleustes

monocuspis (J. L. Barnard & Given 1960)

Stenopleustes monocuspis J. L. Barnard & Given 1960

Mesopleustinae

Mesopleustes

?abyssorum (Stebbing 1888)

Pleustes abyssorum Stebbing 1888

Pleustoidinae

Pleustoides

carinatus Gurjanova 1972

quadridens (Bulycheva 1955)

Sympleustes quadridens Bulycheva 1955

Eosymptinae

Eosymtes

minutus Bousfield & Hendrycks 1994

Pleusymtinae

Pleusymtes

glaber (Boeck 1861)

Amphithopsis glaber Boeck 1861

brevipes Ishimaru 1985

buttoni (Dunbar 1954)

Sympleustes buttoni Dunbar 1954

derzhavini (Gurjanova 1938)

Neopleustes derzhavini Gurjanova 1938

glabroides (Dunbar 1954)

Sympleustes glabroides Dunbar 1954

japonica (Gurjanova 1938)

Sympleustes japonicus Gurjanova 1938

kariana (Stappers 1911)

Sympleustes kariana Stappers 1911

karstensi (J. L. Barnard 1959)

Sympleustes karstensi J. L. Barnard 1959

margulisae Tzvetkova & Golikov 1990

mucida Ishimaru 1985

pleustidsrevised

ochrjamkini (Bulycheva 1952)

Sympleustes ochrjamkini Bulycheva 1952

pacifica Hendrycks & Bousfield 2004

Pleusymtes sp of Staude 1996

Sympleustes subglaber of Austin 1985 non J. L. Barnard & Given 1960

pulchella (G. O. Sars 1893)

Amphithopsis pulchella G. O. Sars 1893

quadrangularis (Margulis 1963)

Sympleustes quadrangularis Margulis 1963

similis (Margulis 1963)

Sympleustes similis Margulis 1963

suberitobia (Gurjanova 1938)

Sympleustes suberitobius Gurjanova 1938

subglaber (J. L. Barnard & Given 1960)

Sympleustes subglaber J. L. Barnard & Given 1960

uncigera (Gurjanova 1938)

Sympleustes uncigera Gurjanova 1938

uschakovi (Bulycheva 1952)

Sympleustes uschakovi Bulycheva 1952

sp of Hendrycks & Bousfield 2004

Sympleustes uncigera of Shoemaker 1955 not Gurjanova 1938

sp 1 of Hendrycks & Bousfield 2004

sp 2 of Hendrycks & Bousfield 2004

Anomalosymtes

coxalis Hendrycks & Bousfield 2004

Budnikopleustes

vasinae (Budnikova 1995)

Pleusymtes vasinae Budnikova 1995

Heteropleustes

setosus Hendrycks & Bousfield 2004

brachypalmus (Ishimaru 1984)

Pleusymtes brachypalma Ishimaru 1984

Holopleustes

aequipes Hendrycks & Bousfield 2004

Kamptopleustes

coquillus (J. L. Barnard 1971)

Pleusymtes coquilla J. L. Barnard 1971

kamui (Ishimaru 1985)

Pleusymtes kamui Ishimaru 1985

spinus Hendrycks & Bousfield 2004

Pleustomesus

media (Goes 1866)

Paramphithoe media Goes 1866

Pleustes medius Stebbing 1906

japonicoides Gurjanova 1972

?palmata (Margulis 1963)

Sympleustes palmata Margulis 1963

Pleustostenus

displosus Gurjanova 1972

Rhinopleustes

acuminatus Hendrycks & Bousfield 2004

Dactylopleustinae

Dactylopleustes

echinoicus (Tzvetkova 1975)

Parapleustes echinoicus Tzvetkova 1975

pleustidsrevised

echinoides Bousfield & Hendrycks 1995

Dactylopleustes echinoicus of Austin 1985 non Tzvetkova 1975

obsolescens Hirayama 1988

sp A SCAMIT 1988§

Pleustinae

Pleustes (Pleustes)

panoplus (Kroyer 1838)

Amphithoe panopla Kroyer 1838

acutirostris Bousfield & Hendrycks 1994b

gurjanovae Bousfield & Hendrycks 1994b

lawrencianus Bousfield & Hendrycks 1994b

obtusirostris Gurjanova 1938

occidentalis (Stimpson 1864)

Amphithonotus occidentalis Stimpson 1864

sibiricus Gurjanova 1972

tuberculatus Bate 1858

Pleustes (Catapleustes)

angulatus Shoemaker 1955

Pleustes panopla angulata Shoemaker 1955

constantinus Bousfield & Hendrycks 1994b

japonensis Gurjanova 1972

paradoxus Gurjanova 1972

victoriae Bousfield & Hendrycks 1994b

Thorlaksonius

brevirostris Bousfield & Hendrycks 1994b

amchitkanus Bousfield & Hendrycks 1994b

borealis Bousfield & Hendrycks 1994b

carinatus Bousfield & Hendrycks 1994b

depressus (Alderman 1936)

Pleustes depressus Alderman 1936

incarinatus (Gurjanova 1938)

Pleustes incarinatus Gurjanova 1938

obesirostris (Bulycheva 1952)

Pleustes obesirostris Bulycheva 1952

platypus (J. L. Barnard & Given 1960)

Pleustes platypus J. L. Barnard & Given 1960

subcarinatus Bousfield & Hendrycks 1994b

truncatus Bousfield & Hendrycks 1994b

sp (Nagata 1960)

Pleustes sp Nagata 1960

Pleusirinae

Pleusirus

secorrus J. L. Barnard 1969

Neopleustinae

Neopleustes

pulchellus (Kroyer 1846)

Amphitoe pulchellus Kroyer 1846

Parapleustes pulchellus Dunbar 1954

boeckii (Hansen 1887)

Paramphithoe boeckii Hansen 1887

carinatus Margulis 1963

columbianus Hendrycks & Bousfield 2004

euacanthoides Gurjanova 1972

kussakini (Budnikova 1995)

Parapleustes kussakini Budnikova 1995

Shoemakeroides

cornigera (Shoemaker 1964)

Sympleustes cornigera Shoemaker 1964

Parapleustes cornigerus Karaman & J. L. Barnard 1979

Stenopleustes cornigera Gurjanova 1972

gagarae (Gurjanova 1972)

Stenopleustes cornigera gagarae Gurjanova 1972

Parapleustes gagarae Karaman & J. L. Barnard 1979

Parapleustinae

Parapleustes

americanus Bousfield & Hendrycks 1995

Parapleustes pacifica (?) of Austin 1985

gracilis Buchholz 1874

Paramphithoe brevicornis G. O. Sars 1895

not Parapleustes gracilis of Ishimaru 1984

ishimarui Bousfield & Hendrycks 1995

Parapleustes gracilis of Ishimaru 1984

Chromopleustes

johanseni (Gurjanova 1951)

Parapleustes johanseni Gurjanova 1951

Parapleustes oculatus of J. L. Barnard & Karaman 1991 (in part)

lineatus Bousfield & Hendrycks 1995

Parapleustes oculatus of Bousfield 1985 (in part)

oculatus (Holmes 1908)

Neopleustes oculatus Holmes 1908

Parapleustes oculatus J. L. Barnard & Given 1960 (in part)

sp. 1 Bousfield & Hendrycks 1995

Parapleustes oculatus of J. L. Barnard & Given 1960 (in part)

Commensipleustes

commensalis Shoemaker 1952

Gnathopleustes

pugettensis (Dana 1853)

Iphimedia pugettensis Dana 1853

Neopleustes pugettensis of Stebbing 1906

Parapleustes pugettensis of J. L. Barnard 1969

not Incisocalliope newportensis J. L. Barnard 1959

not Parapleustes pugettensis of J. L. Barnard & Given 1960

den (Barnard 1969)

Parapleustes den J. L. Barnard 1969

pachychaetus Bousfield & Hendrycks 1995

serratus Bousfield & Hendrycks 1995

Parapleustes pugettensis of Shoemaker 1964

trichodeus Bousfield & Hendrycks 1995

Incisocalliope

newportensis J. L. Barnard 1959

Parapleustes pugettensis of J. L. Barnard & Given 1960 (in part)

bairdi (Boeck 1871)

Paramphitoe bairdi Boeck 1871

Neopleustes bairdi Stebbing 1906

derzhavini (Gurjanova 1938)

Neopleustes derzhavini Gurjanova 1938

Parapleustes derzhavini J. L. Barnard & Karaman 1991

dilatatus (Ishimaru 1984)

Parapleustes dilatatus Ishimaru 1984

filialis (Hirayama 1988)

pleustidsrevised

Parapleustes filialis Hirayama 1988

makiki (J. L. Barnard 1970)

Parapleustes derzhavini makiki J. L. Barnard 1970

nipponensis Bousfield & Hendrycks 1995

Parapleustes derzhavini of Ishimaru 1984 not Gurjanova 1938

Trachypleustes

vancouverensis Bousfield & Hendrycks 1995

trevori Bousfield & Hendrycks 1995

Micropleustes

nautilus (J. L. Barnard 1969)

Parapleustes nautilus J. L. Barnard 1969

behningi (Gurjanova 1938)

Neopleustes behningi Gurjanova 1938

Pleustes behningi Gurjanova 1951

Parapleustes behningi Ishimaru 1984 (in part)

behningioides Bousfield & Hendrycks 1995

Parapleustes behningi Ishimaru 1984 (in part)

longimanus (Ishimaru 1984)

Parapleustes longimanus Ishimaru 1984

nautiloides Bousfield & Hendrycks 1995

Parapleustes species "A" J. L. Barnard 1969



**ASSOCIATE DEAN FOR MARINE SCIENCE PROGRAMS
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Fax: (707) 826-3625**

Application Deadline: Application materials received or postmarked by Friday, March 18, 2005 will be given first consideration. Applications received after March 18, 2005 may be considered if the position is not filled.

Humboldt State University is committed to achieving the goals of equal opportunity and endeavors to employ faculty and staff of the highest quality reflecting ethnic and cultural diversity of the State. Additional information about Humboldt State University can be found at <http://www.humboldt.edu/>. Humboldt State University is an Equal Opportunity/Title IX employer. Applications from and nominations of qualified women, minority candidates, veterans with covered veteran status and disabled persons are particularly encouraged. Humboldt State University hires only individuals authorized to work in the United States.