North East Pacific Asellotes – Status of knowledge of the group in the area D. Cadien 20 Oct 09

The Suborder Asellota is quite diverse in the Northeast Pacific between the equator and the Aleutians. As is usual for this group, diversity increases strongly with depth. While the shallow water asellote assemblage is reasonably well described, that of deeper offshore waters is much more in need of further investigation and description. This is particularly true of lower bathal and upper abyssal depths between 2000-3000m. Examination of samples from this zone has lead to the establishment of a large number of provisional taxa. These come from the investigations done by Buzz Wilson on the Dump Site 103 fauna in the Gulf of the Farallons. He examined benthic samples from that area for several years.

An extensive collection has also been amassed from the materials taken by Oregon State Univeristy in the 1970's now in the hands of Don Cadien. While material undoubtedly remains unanalysed from some earlier efforts, recent regional monitoring samplings have provided additional information on shelf and slope asellotes from throughout the Southern California Bight, the 2003 Baseline Survey conducted off Palos Verdes and the San Pedro Seashelf by LACSD, and the samples taken by CSD in their sample variability study have all provided new asellote materials. So far, 19 asellote families have been recorded from this area. They are discussed below. Family membership can be determined by use of the key to families provided by Wilson (1997) in the Taxonomic Atlas series.

S. O. Asellota		
Family Acanthaspididae		
Acanthaspidea sp CS1 (nr.sulcatacornia)	Cadien 2005§	2816
Family Dendrotiidae		
Acanthomunna tannerensis	Schultz 1966	813-1150
Family Desmosomatidae		
Balbidocolon sp A	Cadien 2005§	
Chelator sp 1	Wilson MS	
Chelator sp 2	Wilson MS	
Desmosoma sp A	Wilson 1997	291-299
Desmosoma sp 1	Wilson MS	1263-2855
Disparella sp 1	Wilson MS	
Eugerda sp 1	Wilson MS	2580-2835
Eugerda sp 2	Wilson MS	
Eugerda sp 3	Wilson MS	
Eugerdella sp 1	Wilson MS	2580
Eugerdella sp 2	Wilson MS	2835
Mirabilicoxa cf richardsoni	Mezhov 1986	
Mirabilicoxa sp 1	Wilson MS	
Mirabilicoxa sp 2	Wilson MS	2462-2855
Mirabilicoxa sp 3	Wilson MS	
Mirabilicoxa sp 4	Wilson MS	
Mirabilicoxa sp 5	Wilson MS	
Momedossa symmetrica	(Schultz 1966)	469-2955
Oecidiobranchus sp 1	Wilson MS	
Prochelator sp A	Wilson 1997	99-2955
Prochelator sp 1	Wilson MS	2462-2830
Prochelator sp 3	Wilson MS	

Family Haplomunnidae		
Abyssaranea cf. rupis	Wilson and Hessler 1974	
Haplomunna caeca	(Richardson 1905)	
Haplomunna hubbsi	Wilson 1976	
Haplomunna sp	Beaulieu 2001§	
Munella sp 174	Cunha and Wilson 2003§	
Thylacogaster sp 2	Cunha and Wilson 2003§	
Thylacogaster sp 2 Thylacogaster sp 138	Cunha and Wilson 2003§	
Thylakogaster sp CS1 (hirsute)	Cadien 2004§	
Family Haploniscidae	Caulen 20049	2013
Haploniscus robinsoni	Menzies & Tinker 1960	
Haploniscus sp CS1 (nocephspine)	Cadien 2004§	
Haploniscus sp CS2 (ceph spine)		
Haploniscus sp 1	Cadien 2004§	2818 2830-2945
Haploniscus sp 1	Wilson MS	
Haploniscus sp 2	Wilson MS	
Family Ischnomesidae	VVIISOIT IVIS	
Cascadiamesus armatus	Cadien MS	2813
Cascadiamesus brevitelson	Cadien MS	
Cascadiamesus careyi		2809-2816
Cascadiamesus hystrix	Cadien MS	
Cascadiamesus subfrequens		2809-2818
Haplomesus sp 1		2770-2835
Haplomesus sp 2	Wilson MS	
Ischnomesus mbari	Cadien MS	
Ischnomesus sp 1	Wilson MS	
Ischnomesus sp 2	Wilson MS	
Ischnomesus sp 3	Wilson MS	
Lobulomesus glabrus		2816-2838
Lobulomesus spinosus		2813-3000
Stylomesus iridescens		2813-2838
Family Janirellidae	Cadien inc	2010-2000
Janirella cf. ornata	Birstein 1960	2835
Family Janiridae	Birotoni 1000	2000
Caecianiropsis psammophila	Menzies & Pettit 1956	intertidal
Caecianiropsis sp LA1	Cadien 1999§	
Caecianiropsis sp LA2	Cadien 1999§	
Caecijaera horvathi	Menzies 1951	2.
lais californica	(Richardson, 1904)	
laniropsis analoga	Menzies 1952	
laniropsis derjugini	(Gurjanova 1933)	
Ianiropsis epilittoralis	Menzies 1952	
Ianiropsis kincaidi	(Richardson 1904)	
Ianiropsis minuta	Menzies 1952	
laniropsis monterenensis	Menzies 1952	
laniropsis tridens	Menzies 1952	
Janiralata davisi	Menzies 1951	
Janiralata occidentalis	(Walker 1898)	
Janiralata solasteri	(Hatch 1947)	
Janiralata triangulata	(Richardson 1899)	
Janiralata sp A	Wilson 1997	160-168
Janiralata sp B	Wilson 1997	168-237
Janiralata sp C	Wilson 1997	
Janiralata sp D	Wilson 1997	91-123
Family Jaeropsididae		
Joeropsis concava	(Schultz 1966)	60-221

	(84	
Joeropsis dubia	(Menzies 1951)	
Joeropsis dubia paucispina	(Menzies 1951)	
Joeropsis lobata	(Richardson 1899)	
Joeropsis sp A	Wilson 1997	54-130
Family Katianiridae		
Katianira sp 1 (subchelate legs)	Wilson MS	2835
Family Macrostylidae		
Macrostylis polaris	Malyutina & Kussakin 1996	
Macrostylis subinermis	Hansen 1916	
Macrostylis sp CS1 (very long uropods)	Cadien 2005§	2820
Family Mesosignidae		
Mesosignum cf. asperum	Menzies & Frankenburg 1968	2835
Family Microparasellidae		
Microcharon galapagoensis	Coineau and Schmidt 1979	
Microcharon sp WS1	Stebbins 2009§	
Family Munnidae		
Munna chromatocephala	Menzies 1952	
Munna fernaldi	George & Stromberg 1968	
Munna halei	Menzies 1952	
Munna magnifica	Schultz 1964	
Munna spinifrons	Menzies & Barnard 1959	220
Munna stephenseni	Gurjanova 1933	
Munna sp A	Wilson 1997	105-237
Munna sp B	Cadien 1989§	
Munna sp C	Cadien 1991§	
Munna sp D	Cadien 1992§	
Uromunna ubiquita	Menzies 1952	
Family Munnopsidae		
Acanthomunnopsis milleri	Wilson 1982	
Baeonectes improvisus	Wilson 1982	
Belonectes sp A	Wilson 1997	280-1372
Betamorpha megista	Thistle & Hessler 1977	
Betamorpha sp 1	Wilson MS	2770-2855
Eurycope californiensis	Schultz 1966	478-2835
Eurycope sp 1	Wilson MS	2580-2945
Ilyarachna acarina	Menzies & Barnard 1959	73-960
Ilyarachna profunda	Schultz 1966	461-2830
Munneurycope pellucida	Birstein 1970	2623
Munnopsurus ochotensis	Gurjanova 1933	
Munnopsurus sp A	Wilson 1997	393-1372
Munnopsurus sp B	Wilson 1997	732-1335
Munnopsurus sp CS1	Cadien MS	1372
Pseudarachna sp 1	Wilson MS	2835
Syneurycope sp CS1 (finger telson)	Cadien 2005§	2815-2820
Vanhoeffenura pulchra	(Hansen 1897)	2487-3570
Vanhoeffenura sp CS1 (nr birsteini)	Cadien 2004§	2762-2820
Family Nannoniscidae	_	
Exiliniscus sp 1	Wilson MS	2945
Exiliniscus sp 2	Wilson MS	
Hebefustis sp CS1	Cadien 2001§	
Nanoniscoides latediffusus	Siebenaller & Hessler 1977	
Nannonisconus latipleonus	Schultz 1966	294-465
Nannoniscus cristatus	Mezhov 1986	2770-2855
Nannoniscus sp 1		2770-2855
Nannoniscus sp 2	Wilson MS	
Family Paramunnidae		

Acanthocope sp CS1 (nr. spinosissima) Boreosignum sp IS1 Boreosignum sp DP1	Cadien 2004§ Cadien 2008§ Pasko 2009§	1372 16-Sep
Munnogonium tillerae	(Menzies & Barnard 1959)	18-1372
Munnogonium waldronense Munnogonium sp SD1	George & Strömberg 1968 Pasko 2003§	
Notoxenoides sp CS1 (careyi)	Cadien & Martin MS	732-1150
Paramunna quadratifrons	Iverson & Wilson 1981	
Paramunna sp A	SCAMIT 1996§	
Paramunna sp 1	Wilson MŠ	
Paramunna sp SD1	Pasko 2003§	
Pleurocope sp A	Wilson MS	
Pleurocope sp IS1	Cadien 2008§	
Pleurogonium californiense	Menzies 1951	90-734
Pleurogonium sp A	Wilson 1997	90-154
Pleurogonium sp CS1 (pleotelserrate)	Cadien 2004§	
Family Santiidae	·	
Santia hirsuta	(Menzies 1951)	
Family Stenetriidae	,	
Stenetrium sp A	Wilson 1997	90-130
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Family Acanthaspididae

Rare in this area, at least in collections. A single individual of a provisional species is known from off Oregon; *Acanthaspidia* sp CS1 Cadien 2005§. This is similar to *A. sulcatacornia* Menzies and Schultz 1967 in most respects, but that species is known only from the Scotia Basin in austral waters. Family percentage undescribed in NEP: 100%.

Family Dendrotiidae

Another rare family, known locally only through *Acanthomunna tannerensis* Schultz 1966. This was originally described from the Tanner Canyon, and was recently retaken in a B'08 sample off Orange County as reported by Tim Stebbins. It is a small mid to lower bathyal species. Family percentage undescribed in NEP: 0%

Family Desmosomatidae

One of the dominant asellote families, particularly at lower bathyal and abyssal depths, but also occurring on the outer Continental shelf and upper slope. Prior to 1965 the family consisted of three genera, *Desmosoma*, *Echnopleura*, and *Eugerda* all from european seas. In 1965 Kussakin added *Eugerdella* and *Paradesmosoma* based on materials from the Northwest Pacific. Then in 1970 Hessler published the watershed work on the group based on materials from the Gay Head – Bermuda transect in the western North Atlantic. He introduced another 10 genera; *Balbidocolon*, *Whoia*, *Momedossa*, *Mirabilicoxa*, *Thaumastosoma*, *Prochelator*, *Chelator*, *Disparella*, *Oecidiobranchus*, and *Torwolia*; and split the family into two subfamilies.

Ten of these 15 genera are currently recognized in material from the NEP. Two taxa are already described; Mirabilicoxa cf richardsoni Mezhov 1986 (recorded off the Farallons), and Momedossa symmetrica (Schultz 1966) recorded fairly widely in Southern California. This latter was originally described as Desmosoma symmetrica by Schultz and later transferred to *Momedossa* by Hessler 1970. Wilson (loc cit) provided a redescription and discussion of this species, as well as publishing descriptions of two provisional taxa in the family, *Desmosoma* sp A, and *Prochelator* sp A. Both of these taxa had been reported in the Santa Maria Basin collections on which the Atlas was based. Illustrations of all three species are available in the Atlas. The remaining provisional taxa have not been illustrated, and have at most brief key characterizations in processing notes. All but one are derived from examination of the Gulf of the Farallons material by Buzz Wilson and include Chelator (2 sp), Desmosoma (1 sp), Disparella (1 sp), Eugerda (3 sp), Eugerdella (2 sp), Mirabilicoxa (5 sp), Oecidiobranchus (1 sp), and Prochelator (2 sp). The exception is one species of Balbidocolon recognized by Cadien in material off Oregon. Other desmosomatids from those collections remain unanalysed, and will probably provide additional provisional taxa in the family. Family percentage undescribed in NEP: 91%.

Family Haplomunnidae

A small family of five genera and only ten described species world wide, with four genera and eight species in the NEP. Two of the members of *Haplomunna* are described (*caeca* of Richardson 1905, and *hubbsi* of Wilson 1976 – both illustrated in Wilson 1976), while the third is still in question. The latter is a species found around the bases of hexactinellid sponge stalks at Station M, off central California at 4000m (Beaulieu 2001). Scattered records of the genus *Thylakogaster* occur, with several from fracture zones in the NEP (Clipperton and Clarion Fracture Zones) and the HEBBLE and PRA sites well off shore Mexico and Central America. These are referred to as *Thylakogaster* sp. 2 and sp. 138 (Cunha and Wilson 2003). An additional taxon is known from Oregon at 2815m, *Thylakogaster* sp CS1 Cadien 2004§. *Abyssaranea* cf *rupis* is recorded from near mid-oceanic equatorial waters by Cunha and Wilson 2003, as is *Munella* sp 174 from the Clarion Fracture Zone.

All these are quite deep, and are probably not going to be encountered in B'08 related samples. Family percentage of provisional species in NEP: 62%

Family Haploniscidae

A large family composed of seven genera worldwide (Wilson excludes *Chandraniscus* George 2003 in a well argued critique, placing those species back in *Haploniscus*) of which only the genus *Haploniscus* is known from the NEP. Five of the six reported taxa are provisional, and several may be identical once descriptions of Wilsons MS names can be obtained. All are found at lower bathyal/upper abyssal depths, and will not occur in the B'08 monitoring samples. There are 115 described species worldwide, 48 in the genus *Haploniscus* alone. Family percentage provisional in NEP: 83%

Family Ischnomesidae

A widely distributed family not previously known from the NEP. Wilson recorded five taxa in two genera from the Gulf of the Farallons, and Cadien records nine taxa in four genera (two new) from off Oregon, and from MBARI material. A monograph of the NEP taxa is in manuscript. There is total separation of the NWP and NEP faunas in this family, Kussakin in 1988 sank several of the generic taxa previously employed into synonymy, leaving 5 valid genera in the family. Of these *Haplomesus* was recorded by Wilson with two provisional species. He also reported three provisional taxa in *Ischnomesus*. Cadien also recognizes one provisional *Ischnomesus* species, which may be the same as one of Wilson's. A single species of *Stylomesus* is represented, a provisional from off Oregon and also some MBARI collections. The remaining species belong to two new genera; one with two provisional species, and the second with five. It is unlikely that any of these species will be taken in B'08, all occurring too deeply. A series of shallower slope samples off Oregon also lacked ischnomesids. Family percentage of NEP provisonal species: 100%.

Family Janirellidae

Janirella of ornata Birstein 1960 has been reported from the Gulf of the Farallons by Wilson, who described it as differing slightly from the original description. Taken at one station a 2835m. The family is not otherwise reported from the NEP. Percentage of NEP provisional taxa: 0%.

Family Janiridae

A major asellote family, very well represented in the shallow waters of the SCB, and extending into intertidal communities of both sandy and rocky shores. A series of species are also found in the mid to outer shelf zones, but only one of the known species extends down to the upper bathyal zone at 237m (*Janiralata* sp B Wilson 1997). There are 20 species distributed among 5 genera in the NEP. Two of these are represented by a single described species, *Caecijaera* (*horvathi* Menzies 1951), and *Iais* (*californica* Richardson 1904). *Caecijaera* is a commensal of *Limnoria*, and lives in their wood burrows, while *Iais* is an ectoparisite or commensal of sphaeromatid isopods, living on their gills. The latter is actually an introduced species, which was detected and described here, although originally from Australia or New Zealand (Brusca et al 2007).

Nearly all the janirids known from the NEP are keyed by Brusca et al 2007. Exceptions are the provisional species of *Janiralata* (keyed, described, and illustrated in Wilson 1997), *Iais californica* (which is discussed and illustrated, but not keyed), and the two provisional *Caecianiropsis* from the SCB. These were discussed in emails to the Taxonomic Listserver for Bight '98, and are available from several sources. Family percentage of provisional names in NEP: 30%.

Family Joeropsididae

A worldwide family composed almost exclusively of members of the genus *Joeropsis* (70 described species worldwide). Two species of *Scaphojoeropsis* are also known from austral waters. The genus is represented in the NEP by three described species (one with two subspecies), and one provisional. There is unfortunately no common key to all these forms, although *J. dubia* and *J. lobata* are keyed in Brusca et al 2007, and *J. concava* and sp A are keyed in Wilson 1997. The genus is typically found on

the shelf, but *J. concava* extends down to upper slope depths. *Joeropsis dubia* is found from the intertidal to mid-shelf depths, and is by far the most frequently encountered member. Percentage of NEP provisional species: 25%.

Family Katianiridae

Another small deep-sea family of asellotes composed of only two genera and six described species worldwide. A single provisional species is recorded from local waters; *Katianira* sp 1, taken by Wilson in the Gulf of the Farallones area. Based on his notes a specimen taken off Oregon is believed to be the same. Both are from lower bathal/upper abyssal depths around 2800m. This small group was evaluated by Svavarsson in 1987. Family percentage of provisional taxa in NEP: 100%.

Family Macrostylidae

A bathyal/abyssal family of only two genera; *Desmostylis* (2 Antarctic species), and *Macrostylis* (61 described species worldwide). In the NEP three species have been recorded, one of them provisional. None were seen in the Gulf of the Farallones material examined by Wilson, and the other records come from off Oregon. Kussakin (1999) monographed the family from the north Pacific. It is probable that more macrostylids will be recognized in the Oregon material, as processing of the family in those samples is just preliminary. Family percentage of NEP provisionals: 33%.

Family Mesosignidae

Recorded from a single station at 2835m in the Gulf of the Farallones by Wilson, and not found in Oregon samples. *Mesosignum* cf. *asperum* Menzies & Frankenburg 1968 is noted as being very close to the nominate form, differing slightly in spine length, which Wilson viewed as probably somewhat variable. The species was originally described from a station off the Pacific coast of Costa Rica. Worldwide the family contains 17 described species, all but one in the genus *Mesosignum*. Family percentage of NEP provisional taxa: 0%.

Family Microparasellidae

A single provisional species is reported from California, with *Microcharon galapagoensis* Coineau and Schmidt 1979 the only form described from the NEP. The local form was first noticed in materials originally identified as *Caecianiropsis* by Tony Chess (USFW, retired) on Catalina. Examination of his specimens at a SCAMIT meeting lead to the detection of a provisional microparasellid in our area, which was not named at the time (SCAMIT NL Vol. 17(12)). Tim Stebbins, refound this species in B'08 materials, and is creating a voucher sheet to document it based on those specimens as *Microcharon* sp WS1. The three genera of the Microparasellidae can be separated using the key provided by Wilson and Wagele 1994. They are *Angliera* (10 described species), *Microcharon* (74 described species), and *Paracharon* (1 described species). Members of the Microparasellidae can be separated easily from the janirid genus *Caecianiropsis* based on the structure of the uropods. Family regional percentage provisional: 50%.

Family Munnidae

A large family of 105 described species in 7 genera worldwide. It is also well represented in shallow waters of the NEP, with 11 recognized species in two genera. Ten of these, including four provisionals, are in the genus *Munna*. At least two of these forms reach the upper slope, but the family is much better represented on the continental shelf, with many of the species also occurring intertidally. There is no published key to all these, but a comprehensive draft key (dating from 1991) is available from Don Cadien upon request. The described species are keyed by Brusca et al 2007. Regional percentage provisional taxa: 36%.

Family Munnopsidae

A very large family of 304 described taxa distributed among 38 genera.. The North Pacific fauna was recently monographed by Kussakin (2003). In the NEP eighteen species (9 provisional) in 11 genera are reported. The three provisional species which occur in the SCB, and might be taken in the B'08 samples, are all described and illustrated by Wilson 1997. At least one of these, Munnopsurus sp A, has been taken in B'08 samples processed by LACSD. While a few representatives reach upper slope depths, or even the shelf in cooler seas, this is predominantly a deep-water family. Many of the genera in the family are natant, and spend a considerable amount of time off the bottom swimming. Nearly all these are poorly calcified, generally smooth forms, with highly modified pleons. In swimming forms this constitutes the natasome, which is often broadened from the width of the pereon, and bears modified paddle-shaped pleopods. Video of some local members swimming has been taken in the Monterey Canyon by researchers at MBARI, now at Scripps. Pereonites are nearly always lacking in collected specimens, as they are very delicate and extremely elongate as shown in the videos. Heavily calcified, often spiny, benthic forms also occur in the family, as well as intermediates like Ilyarachna, which have more calcification but also modified swimming pleopods.

Three of the provisional species were created by Wilson based on collections from the Gulf of the Farallons, while three others were taken off Oregon. The remaining three provisionals are more widely distributed, occuring in the SCB, and have been illustrated (and keyed) by Wilson 1997. No unitary key to genera in the family is available, although that of Kussakin 2003 is reasonably comprehensive (but in Russian). Recent descriptions of numerous forms from the Antarctic point to considerable undescribed diversity still remaining in the family. Regional percentage provisional taxa: 50%.

Family Nannoniscidae

A large family of small deep water animals; 78 described taxa distributed among 13 genera worldwide. Six of these are represented in the NEP, mostly by provisional taxa. Single described species of *Nanoniscoides*, *Nannonisconus*, and *Nannoniscus* have been reported. Four provisional taxa stem from Wilson's Gulf of the Farallons work, 2 *Exilinscus* sp, and 2 *Nannoniscus* sp. Cadien has recognized a single undescribed *Hebefustis* species from Oregon, but most nannoniscids from those samples remain unevaluated. More provisional taxa, possibly in other genera, are to be expected from this deep Oregon material. The only nannoniscid likely to be encountered in the B'08 samples is *Nanonisconus latipleonus* Schultz 1966, originally described from the

Redondo Canyon at 465m. Other SCB records for this species have expanded the known bathymetric range up to 294m.

Wilson (2008) has evaluated character usage in the family, and provides a key to the world genera. North Pacific nanoniscids are covered at length by Kussakin (1999) who illustrates the described species recorded from the NEP.

Family Paramunnidae

A large and diverse family distributed worldwide, but most prominant in the southern Ocean. Until recently several paramunnid genera were dumping grounds for generally similar taxa, but no good systematic review had clarified relationships within the group. In the last decade the group has been targeted by Wilson and Just, resulting in considerable erection of new generic taxa, and parsing of "trash-can" generic concepts (Just and Wilson 2004, 2006, 2007). As a result the family now has 39 recognized genera, and roughly 140 species. Much remains to be done, however, and some taxa originally described as *Paramunna* are now recognized as not belonging to that genus, but remain without appropriate genera to receive them. This includes all of the local Paramunna species; P. quadratifrons Iverson and Wilson 1981, P. sp. A SCAMIT 1996§, P. sp 1 Wilson MS, and P. sp SD1 Pasko 2003§. Six other genera are recorded from the NEP; Acanthocope (sp CS1), Boreosignum (sp IS1, sp DP1), Munnogonium (tillerae, waldronense and sp. SD1), Notoxenoides (sp CS1), Pleurocope (sp IS1, sp A), and Pleurogonium (californiense, sp A, and sp CS1). Both the species, and the differences which separate them, are often minute, and misidentifications have been rampant in this family. Previous records of introductions to California of Metamunna wilsoni and Pleurocope floridensis from the Florida Middlegrounds have both proven to be based on misidentification of local (probably) provisional taxa.

In part because the process of reassessment of the paramunnids is not yet complete, there is no currently applicable generic key to the family, Given the large number of provisionals in this group, no species level key to NEP taxa is available either. Efforts in that direction are underway, but not yet completed. Regional percentage of provisional taxain the family: 75%.

Family Santiidae

Represented by a single taxon in the NEP, *Santia hirsuta* (Menzies 1951). Worldwide the 28 described species are distributed among 5 genera, with most in *Santia* (19 species). The species is both keyed (to family), and illustrated in Brusca et al 2007. The family is also keyed, with no discussion of the species, in Wilson 1997. Family regional percentage provisional taxa: 0%.

Family Stenetriidae

A very unusual occurrance of an animal usually found in tropical waters. Stenetrium sp A was taken off central California in the Santa Maria Basin survey, and illustrated and discribed by Wilson 1997. It is a relatively shallow asellote, ranging from 90-120m depths on the mid-shelf. Stenetriids are immediately recognizable by the nature of the gnathia. Percentage provisional taxa in NEP: 100%.