

Notes on Norwegian marine Amphipoda 7. Amphipod associates of *Geodia* sponges in western Norway

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The rarely collected amphipod species *Amphithopsis longicaudata* Boeck (Calliopiidae), *Cheirimedon latimanus* (Sars) (Lysianassidae), *Laothoes meinerti* Boeck (Calliopiidae) and *Phippsiella similis* (Sars) (Stegocephalidae) have been collected in the Bergen area, western Norway, in association with the large and compact sponges of the genus *Geodia*. The amphipods seem to live on rather than in the sponge hosts.

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The very large and compact sponges of the genus *Geodia* are characteristic elements of deep fjord exposed hard bottoms subject to strong currents. They share this habitat with i.a. the huge gorgonacean sea-trees *Paragorgia arborea* (L.), various octocorallians and the large bivalve *Acesta excavata* (Fabricius); under favourable circumstances the stone corals of the *Lophelia*-community are also found. Good examples of such a habitat (though too deep for *Lophelia*) are the huge underwater cliffs of Sængsbukten and Skorholmen (c. 60°N, 5°E) at the entrance of Korsfjorden S. of Bergen in western Norway.

Collecting with a triangular dredge and separating the dominant invertebrates directly the dredge has come aboard, admittedly a very coarse method, showed that a number of uncommon amphipod species usually are found on *Geodia*. The amphipods seem to live on the surface of rather than inside the sponge host, as dissecting the *Geodia* and rinsing with alcoholized sea water yielded very few additional speci-

mens. As the amphipods usually were damaged by the dredging, no biological data on the association could be obtained.

The species found consisted of a mixture of ubiquitous, scavenging species more readily collected in baited traps (Vader 1972) and a few species found virtually exclusively in this habitat. The latter were the Calliopiidae *Amphithopsis longicaudata* Boeck and *Laothoes meinerti* Boeck, the Lysianassidae *Cheirimedon latimanus* (Sars) and the Stegocephalidae *Phippsiella similis* (Sars) (Table 1). Another stegocephalid species, *Stegocephalus inflatus* Krøyer, was also regularly present, but this species is as common in samples without *Geodia*; the same applies, although in a lesser degree, to the isopod *Janira maculosa* (Leach). Also listed in Table 1 are the specimens caught of two common associates of soft-bodied sponges in the area, the Leucothoidae *Leucothoe spinicarpa* (Abildgaard) and the Lysianassidae *Aristias neglectus* Hansen; the many *Aristias* in sample 426/69 are due to the

Table 1. Amphipods collected in dredge hauls with *Geodia* sponges in the outer Korsfjord near Bergen, W. Norway. The haul numbers are those of the fauna-files of the Institute of Marine Biology, Univ. of Bergen. See further text.

	Skorholmen				Sængsbukten		
	382–69	383–69	392–69	394–69	424–69	425–69	426–69
<i>Amphithopsis longicaudata</i>	1	1	1	5	2	—	1
<i>Cheirimedon latimanus</i>	—	—	—	1	—	1	—
<i>Laothoes meinerti</i>	—	—	3	—	—	—	1
<i>Phippsiella similis</i>	2	24	c20	c20	—	—	—
<i>Stegocephalus inflatus</i>	6	—	8	—	4	6	—
<i>Janira maculosa</i> (Isopoda)	5	1	c20	c20	—	10	many
<i>Aristias neglectus</i>	—	2	—	1	1	—	(c200)
<i>Leucothoe spinicarpa</i>	—	—	2	—	—	1	2

presence in this haul of the soft-bodied sponge *Mycale lingua*.

One further specimen of *Laothoes meinerti* was collected in the Bergen area. This was in or on *Mycale lingua* in the nearby Raunefjord (240 m, E 351—68), together with 5 *Leucothoe spinicarpa* and many *Aristias neglectus*.

Neither *Cheirimedon* nor *Laothoes* has been collected away from sponges by me, and *Amphithopsis* and *Phippsiella* only in isolated specimens. One specimen of *Phippsiella similis* was collected in a tunicate in the same general area (Fanafjord, 180—190 m, E 124—69), together with another habitual sponge associate in the Bergen area, the lysianassid *Perrierella audouiniana* (Bate) (for a similar record, see Norman 1900).

A survey of the available literature gave very little information on the biology of these rarely collected species, but the few data found are in agreement with an association with sponges.

The little-known *Cheirimedon latimanus* has once been found 'between spiculae of sponges'. Other *Cheirimedon* species appear to be demersal scavengers, but as noted by Barnard (1969), *C. latimanus* does not really seem to belong to the genus *Cheirimedon*.

The mode of life of the Stegocephalidae also remains largely unknown, although Moore and Rainbow (1984) surmise that many species in this family live as temporary parasitoids on large soft-bodied coelenterates. They base this conclusion in part on the presence of ferritin-crystals in the gut caeca and the high iron content of many coelenterates; they found no ferritin-crystals in the one sample examined of *Phippsiella similis*, however.

Sars (1890—95) gives as habitat for both *Stegocephalus inflatus* and *Phippsiella similis* 'the region of the deep-water corals'. Stephensen (1925, 1945—42) reported the species several times 'from sponges' or 'in the grooves of *Geodia*', in good agreement with the present data.

Nothing has ever been written on the habitat or biology of *Laothoes meinerti*. The species is, among the Norwegian Calliopiidae, primarily characterized by the peculiar maxillipeds, with very large and heavily serrated outer plates that nearly reach to the tip of the palps. As pointed out earlier by Pirlot (1932), similarly specialized maxillipeds occur in unrelated sponge-burrowing forms, such as the lysianassid *Perrierella audouiniana* (Bate) and the dexaminid *Tritaeta gibbosa* (Bate).

Although I have been unable to find any published records of the association, *Amphithopsis*

longicaudata is in Norway generally regarded as a sponge associate. As so many other sponge-associated amphipods, also *A. longicaudata* can occasionally be found in ascidians (Aurivillius 1886). Schiecke (1973) has described the biology of the closely related Mediterranean species *A. depressa* Schiecke (sub nom. *Spongula depressa*). These depressed, isopod-like amphipods crawl around on the surface of their sponge-host, preferably near the oscula, and probably feed as commensals by filtering the feeding-currents of the sponges. Another strongly dorsoventrally flattened calliopiid amphipod, *Chosroes incisus* Stebbing, also appears to be an associate of sponges (Barnard 1932).

Stephensen (1935—42) recorded also the paramphithoid amphipod *Epimeria tuberculata* Sars 'from the grooves of *Geodia*', together with *Phippsiella similis*. I have never collected this species myself, but I have found the related *Paramphithoe hystrix* (Ross) on sponges in northern Norway, and this species has recently been shown to be a sponge predator, ingesting even the spicules (Oshel & Steele, in press).

Finally, it is worth noting that haul 425—69 (Sængsbukten, 610—400 m) also contained a single specimen of the very rare stenothoid amphipod *Metopa leptocarpa* Sars, known from only a few specimens. No association with sponges should be inferred from this single record, of course.

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Notes on Norwegian marine Amphipoda. 8. Amphipods found in association with sponges and tunicates

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Nineteen amphipod species in seven different families have been recorded living on or in Porifera and/or Tunicata in Norwegian waters. Of these *Laothoes meinerti*, *Cheirimedon latimanus* and two species of Paramphithoidae are confined to sponges, while *Lysianella petalocera*, *Orchomene* spp., *Andaniella pectinata* and *Stenothoe marina* have been collected from ascidians, but not from sponges. The most common symbiotic amphipods in Norwegian waters are *Leucothoe spinicarpa*, *Aristias* spp. and *Perrierella audouiniana*; these amphipods, and also *Amphithopsis longicaudata*, *Tritaeta gibbosa* and *Phippsiella similis* have been found both in association with sponges and with ascidians.

Little is known about the biology of any of these associations.

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This note compiles published and unpublished records of associations of Norwegian amphipods with sponges and ascidians. This has been done because no such listing exists and many records consequently tend to be overlooked, and also to impress the fact that a considerable number of amphipod species can live both in sponges and in ascidians. This survey is restricted to Norwegian (inclusive Skagerak and Bohuslän) and Spitsbergen waters. I know of no Norwegian amphipods species, however, that have been recorded in association with sponges and ascidians abroad, but not in Norway, with the possible exception of associations from very

shallow water (Frith 1977, Peattie & Hoare 1981).

In the following list only original records are mentioned, not compilations (like Arndt 1933). The correct names of the host sponges and ascidians are in many cases not known, and host identifications therefore will not usually be given here. The amphipods are listed in alphabetic order of families, genera and species. My own unpublished data have been included.

Calliopiidae

Amphithopsis longicaudata Boeck

Porifera. Generally considered to be a sponge