

SARSIA



OCCURRENCE OF THE THALASSINID *CALLIANASSA SUBTERRANEA* (MONTAGU) (CRUSTACEA, DECAPODA) ON THE COAST OF SOUTHERN NORWAY

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During the winter 1988-89 there was extensive renewal of water in many of the threshold fjords in the southernmost part of Norway. A result of this was that water containing hydrogen sulphide from the deepest parts of the fjords was raised close to the surface, killing many fish and bottom organisms. While diving in one of the fjords, Trysfjorden, Vest-Agder county (58°05'N, 07°41'E), a number of dead *Callianassa subterranea* (MONTAGU) were observed on the bottom between 5-9 m depth. Many of the specimens were ovigerous females. Earlier, only some records of juvenile specimens have been reported from Southern Norway.

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The mud shrimp *Callianassa subterranea* (MONTAGU) has a geographical distribution from the Mediterranean to the coast of Norway (see e.g. ATKINSON & NASH 1990; ROWDEN & JONES 1994). According to DE SAINT LAURENT & BOŽIĆ (1972), the species has been reported to be commonest in the northern part of its range. It is common in the subtidal muddy Oyster Ground of the southern North Sea (WITBAARD & DUINEVELD 1989), and has also been found to be common on scuba investigated sites off the Scottish west coast (ATKINSON & NASH 1990). In Scandinavian waters *C. subterranea* has been reported from several localities on the west coast of Sweden (GUSTAFSON 1934), and POULSEN (1940) found the species to be common in suitable localities in Danish waters. The first record of *C. subterranea* from the coast of Norway was published in 1982 by CHRISTIANSEN & GREVE. This was a young specimen which had been collected 32 years earlier (18 July 1950) by N. Knaben during a cruise with R/V *G.M. Dannevig*. It was found

between 60 and 100 m depth at 58°15'N, 08°35'E and measured 3.1 mm from the tip of rostrum to the middle of posterior margin of carapace.

JOHANNESSEN & al. (1989) found some specimens of Callianassidae juv. indet. from 7 and 20 m depth at Stord, Hordaland county, and also a specimen of Callianassidae indet. (juvenile, Johannessen, pers. commn) from 12 m in the vicinity of Bergen, Hordaland county (JOHANNESSEN & al. 1991). RYGG (1994) and OUG & HELLAND (1995) reported two specimens of *Callianassa tyrrhena* (PETAGNA) from 50 m depth between Arendal and Grimstad, Aust-Agder county and in Kristiansandsfjorden, Vest-Agder county, respectively. The specimens which are very small juveniles were identified as *C. tyrrhena* in accordance with ENCKELL (1980), who placed *C. subterranea* as a synonym of *C. tyrrhena* (Rygg, pers. commn). Probably all the juveniles from the above mentioned localities belong to *C. subterranea* which are so far the only spe-

cies of *Callianassa* known from Norwegian waters. In addition, a few larvae of *C. subterranea* have been recorded in the Oslofjord (K. Smedsrud 1982, unpublished cand. real. thesis, University of Oslo).

During the winter 1988-89 periods of prevailing southwesterly wind along the south coast of Norway resulted in an extensive renewal of water in many of the threshold fjords in the southernmost part of Norway (BØHLE & al. 1989). Deep water in the fjords containing hydrogen sulphide was raised close to the surface, killing many fish and bottom invertebrates.

One of the fjords, Trysfjorden in Vest-Agder county (58°05'N, 07°41'E) became the object of a closer investigation (OUG 1989). Trysfjorden is 7 km long with two 85 m deep basins connected by a 4.7 m deep threshold. At the entrance of the fjord the threshold is 11 m deep. In the inner basin of Trysfjorden, the oxygen concentration below 20 m has for many years been at critically low values (OUG 1989). During diving in the inner basin between 1984-1988 by one of us (R.O.S.), rotten bottom was observed at 20-22 m depth.

At the end of January 1989 the water was greatly discoloured. On 30 January the old deep water containing hydrogen sulphide had been raised to less than 5 m depth in the inner basin, and the oxygen concentration at this depth was measured to nearly zero (BØHLE & al. 1989; OUG 1989).

Diving was continued in 1989 by one of us (R.O.S.), and on 21 January living specimens of the bivalve *Arctica islandica* (L.) were seen at 11 m and the asteroid *Asterias rubens* L. at 12 m depth. In addition to several living and dead invertebrate species in shallower water, dead irregular echinoids were observed at 9 m and recently dead specimens of the bivalve *Mya truncata* L. at 10 m depth.

On 31 January a few dead mud shrimps were observed on the sediment at 9 m depth in the inner basin. On 16 February many decomposed and a few living mud shrimps were seen at 5-7 m depth, and on 17 February between 60 and 70 specimens were collected from the muddy bottom. Two individuals were only just alive. All the others were dead and some partly decomposed. The specimens turned out to be *Callianassa subterranea*. The length from the tip of rostrum to the middle of posterior margin of carapace of 40 specimens was 9-12 mm. Of these, 35 were ovigerous females (eggs without eyespots) and five were males. In mid March 1989 only decomposed mud shrimps were found on the bottom at 9 m depth. A few living *Arctica islandica* were seen at 10.5 m, whereas no sign of life was seen at 12 m depth in March.

During diving in the inner basin in June 1989, some species of living invertebrates were again seen in shallower

water down to 6 m, while no life was found between 6 and 14 m depth. In November 1989 living sessile invertebrates were observed down to 11 m, but no signs of mud shrimps were seen.

Among some individuals of *C. subterranea* collected on 31 January 1989, two specimens of *Upogebia deltaura* (LEACH) and one ovigerous female of *U. stellata* (MONTAGU) were also found. These two thalassinid species have earlier been reported from western Norway (TAMBS-LYCHE 1958; SAMUELSEN 1974), *U. deltaura* also from southern Norway and the Oslofjord (TAMBS-LYCHE 1958). One of us (M.E.C. unpublished records) has found several specimens of *U. deltaura* in the Oslofjord and larvae of this species have also been recorded in this fjord (K. Smedsrud 1982, unpublished cand. real. thesis, University of Oslo). One ovigerous specimen of *U. stellata* has been found in the Oslofjord by B. Christiansen.

The burrowing habits of the thalassinids may probably be the main reason for the apparent rarity of *C. subterranea* in Norwegian waters. The species occurs in muddy or sandy sediments from the intertidal to water depths of at least 50 m (ROWDEN & JONES 1994). Burrows constructed by *C. subterranea* have been described by a few authors (see e.g. ROWDEN & JONES 1995). Maximum depth of burrows on the west coast of Scotland measured from 24 to 81 cm (ATKINSON & NASH 1990). The numbers of *C. subterranea* and especially the many ovigerous females found in Trysfjorden, suggest that the species is common on suitable localities on the south coast of Norway.

Specimens of *C. subterranea* from Trysfjorden and the two *Upogebia* species from Trysfjorden and the Oslofjord mentioned above are deposited at the Zoological Museum, University of Oslo.

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