

Heterobranchia (Mollusca, Gastropoda) from northern Norway, with notes on ecology and distribution

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During a diving expedition through northern Norway, a total of 25 heterobranchiate taxa were collected, and additional data on distribution and ecology were given. *Cumanotus beaumonti* and *Flabellina borealis* are recorded for the first time since Odhner (1907), (1922) on the Norwegian coast, and the distribution of eight heterobranch taxa were re-evaluated. By using SCUBA diving as a sampling method, it is proved that the diversity and distribution of heterobranchs is poorly known in northern Norwegian waters, as the results show that large quantities of specimens, as well as a significant number of taxa, are found at each locality. The significance of diving for studying heterobranchs is emphasised. Apart from new records of heterobranchs and enhanced knowledge of biodiversity and biogeography of this group in northern Norway, this paper presents previous published literature where heterobranch taxa are mentioned for northern Norway.

Keywords: Heterobranchia, Nudibranchia, northern Norway, biogeography, biodiversity

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INTRODUCTION

In July 2002 a survey covering the three northernmost counties in Norway, Finnmark, Troms and Nordland, were conducted. The intention was to collect nudibranchs at different sites visited during the journey, first of all to visit the eastern part of Finnmark, an area poorly investigated for marine benthic macro-organisms (Brattegard & Holthe 1997). Four different localities were surveyed in this area. Only one location was surveyed in Troms, and three in Nordland.

To get a better understanding of the diversity and distribution along the Norwegian coast for marine benthic macro-organisms, a catalogue edited by Brattegard & Holthe (1997), divided the coast in 26 sectors (Figure 1). The compilation of heterobranchs (including nudibranchs and sacoglossans) in this volume (Høisæter et al. 1997) gives a detailed knowledge of taxa previously found in each sector. The sectors are also referred to in this work along with the localities where sampling was undertaken (see Figure 1).

The knowledge of the fauna of nudibranchs in northern Norway is variable (Høisæter et al. 1997), where some areas have been more thoroughly sampled than others, judged from the number of taxa in an area. There are no previous attempts to only exam-

ine the nudibranch fauna of northern Norway. Nonetheless, a variety of journeys and expeditions have included nudibranch taxa attempting to describe the marine benthic fauna of northern waters. The first scientific annotations of nudibranchs from northern Norway are found in Gunnerus (1770). But it was not until the middle of the 19th century that nudibranch taxa were found in the fjords of northern Norway, where Lovén (1846), M. Sars (1851, 1859), M'Andrew & Barrett (1856) and Danielssen (1861) list nudibranch taxa from their journeys. With the growing interest to explore the marine fauna in North Atlantic areas, nudibranch taxa were included among other molluscs in papers by G. O. Sars (1872, 1878), Schneider (1885), Aurivillius (1886), Krause (1897), Friele & Grieg (1901), Friele (1902), Odhner (1907), Grieg (1913) and Dons (1942a, 1942b, 1942c). The emergence of nudibranch specialists allowed a greater knowledge of northern species from the works of Bergh (1886) and Odhner (1922, 1929, 1939). Since then, no papers have mentioned new records for the northern areas of Norway. More recent papers including records of nudibranch taxa from Norwegian waters are compilations of previous records. Høisæter (1986) and Høisæter et al. (1997) are the most comprehensive works giving an overview of the taxa found.

The aim of this paper is to enhance the knowledge regarding faunistics and distribution of nudibranchs in northern Norway based

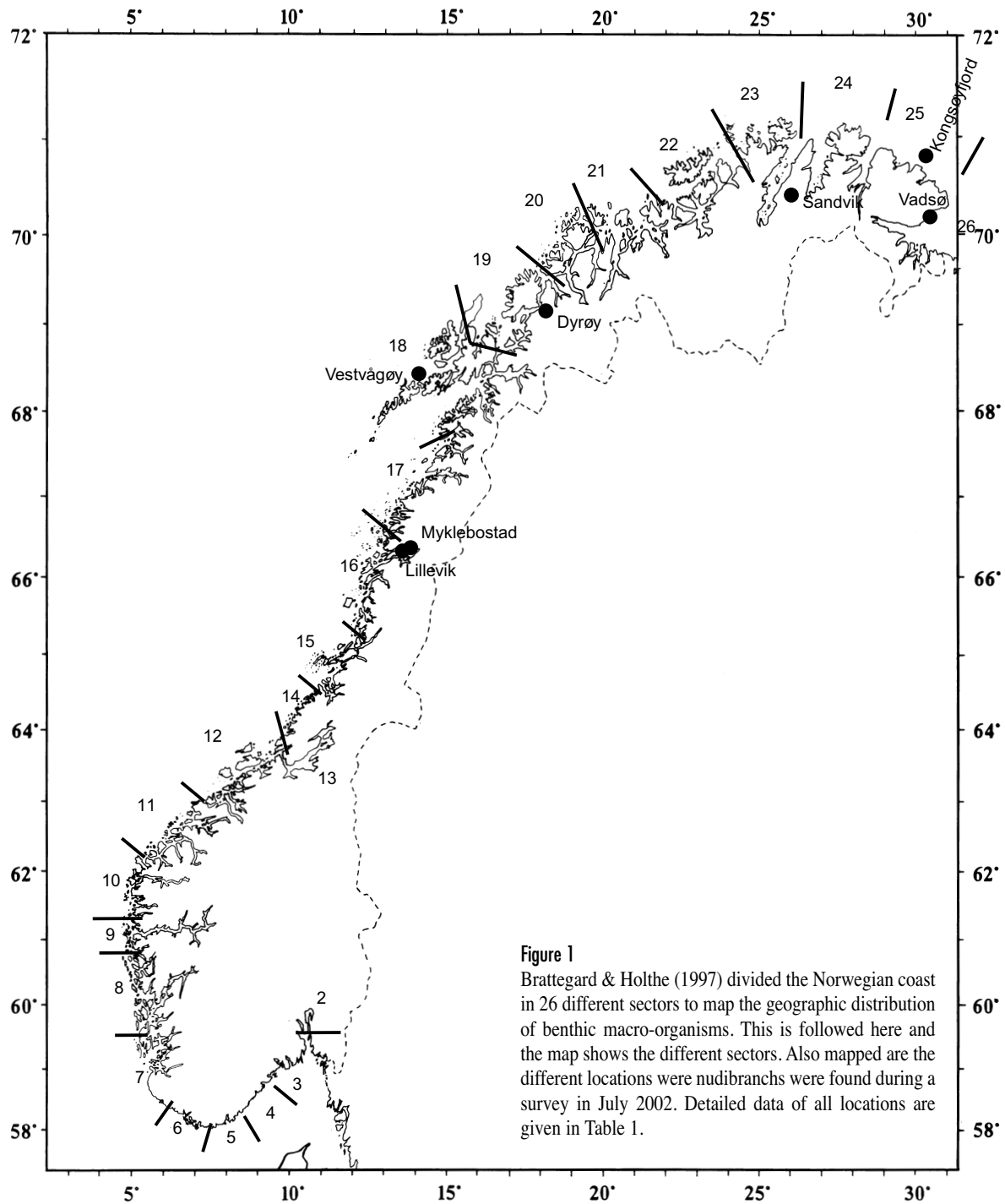


Figure 1

Brattegård & Holthe (1997) divided the Norwegian coast in 26 different sectors to map the geographic distribution of benthic macro-organisms. This is followed here and the map shows the different sectors. Also mapped are the different locations where nudibranchs were found during a survey in July 2002. Detailed data of all locations are given in Table 1.

MATERIAL AND METHODS

on our new data. Knowledge of distribution and biogeography of this group is also important to get a better understanding of its diversity in Norwegian waters. All, to our knowledge, previously published papers including heterobranch taxa is mentioned or discussed, as a review of literature covering the group for northern Norway.

The localities were investigated by SCUBA diving from an inflatable boat or from near-shore sites. The data given are based on nudibranch specimens observed *in situ*, or if they could not be identified when diving, they were collected in 0.5 l jars and brought ashore for identification. Observations are therefore based on both observed and collected specimens. Taxa easily

Table 1. Localities in northern Norway surveyed in July 2002, where different taxa of nudibranchs were found. To indicate sampling effort, number of dives (SCUBA) is reported as a single dive performed by buddy pair.

Locality	Latitude (N)	Longitude (E)	Date	Depth	Number of dives
Kiby, Vadsø	70°03.647'	29°51.362'	2002-07-09	5-20	4
Kongsøya, Kongsøyfjord	70°42.869'	29°27.928'	2002-07-10	5-20	4
Helløya, Kongsøyfjord	70°43.591'	29°27.073'	2002-07-11	5-12	6
Indre Sandvik, Porsangerfjord	70°19.366'	25°10.602'	2002-07-13	10-20	4
Dyrøysundet, Dyrøy	69°05.400'	17°35.944'	2002-07-14	8-28	4
Kråka, Borgvær, Vestvågøy	68°20.100'	13°58.756'	2002-07-16	10-17	8
Myklebostad, Sjona	66°18.346'	13°29.310'	2002-07-19	2-30	5
Lillevik, Einmoen, Nesna	66°17.039'	13°14.201'	2002-07-20	15-27	5

identified in the field were usually not sampled, as a general principle, but as the fauna in the investigated areas are general poorly known, a number of specimens had to be collected for further studies. In the "Results" the caption "Observations" include both specimens observed *in situ*, where their presence was noted, and specimens collected and identified in the field by the aid of a stereo microscope, but not preserved. Specimens preserved are referred specifically for each species by location with number of specimens in brackets. Preserved material is deposited at the Museum of Archaeology and Natural History (VM), Norwegian University of Science and Technology (NTNU). Radula for some specimens has been examined and digitally photographed in a Leica IRB inverted microscope.

Observations on ecological traits such as possible prey organisms, abundance, reproductive signs (egg strings, copulation and mature gonads) and size of the specimens were also noted. In all cases, samples were collected when nudibranchs were found on possible prey, or found spawning on other sessile organisms.

Sampling intensity is reported as single dives undertaken by one diver, implying that the effort by a buddy pair is counted as two single dives. This is done to give an indication of sampling effort at each locality, although it does not give any exact information concerning duration of a dive or how long time the divers spent actually searching and sampling.

Data for all localities are given in Table 1. In the area at Kråka, Vestvågøy it was dived at two different locations in close proximity to each other with a similar habitat.

RESULTS

A complete list of heterobranch taxa found and/or observed is presented in Table 2.

Sacoglossa

Placida cf. dendritica (Alder & Hancock, 1843)

Material examined. Kongsøya, Kongsøyfjord (1), 5 mm, VM-222; Helløya, Kongsøyfjord (2), 5 mm, VM-221.

Observations

Several specimens were observed at Helløya. All specimens found were on the alga *Desmarestia aculeata* (L.) Lamouroux.

Remarks

This herbivore species has previously not been referred to north of the Bergen area (sectors 8 and 9) (Høisæter et al. 1997), but it is found several times at Agdenes, at the mouth of the Trondheimsfjord (sector 12) by the authors. The present record is new for sector 25, and suggests a pan-sectoral distribution. Trowbridge (1995) suggests that this cosmopolitan species is a complex of sibling species, and the identification is therefore referred to.

Nudibranchia

Acanthodoris pilosa (O.F. Müller, 1789)

Material examined. Indre Sandvik, Porsangerfjord (1), 25 mm, VM-193.

Remarks

The present record is new for sector 24. Otherwise this species is recorded along the whole coast (Høisæter et al. 1997), although it is not frequently reported in the literature (Evertsen 2001).

Archidoris pseudoargus (Rapp, 1827)

Material examined. Kongsøya, Kongsøyfjord (1), 40 mm, VM-223; Kråka, Borgvær, Vestvågøy (1), 25 mm, VM-200.

Observations

At both locations in the Kongsøyfjord (Kongsøya and Helløya) numerous specimens from 25 to 100 mm in length were observed feeding and spawning on the sponge *Halicondria* sp. Several specimens were also observed spawning at Kråka, Vestvågøy.

Table 2. Distribution of heterobranch taxa along the Norwegian coast is shown for the taxa included in this paper. Records from the present survey are indicated in bold, where shaded areas indicate a new record for the given sector. For detailed information for each taxon, see text. The symbols for distribution are used according to Brattegard & Holthe (1997), S - a taxon with a southern distribution with its northern border along the Norwegian coast; N - a taxon with a northern distribution with its southern border along the Norwegian coast; X - a taxon with a pan-sectoral distribution.

Sector	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
Sacoglossa																											
<i>Placida dendritica</i> (Alder & Hancock, 1843)	X	x						x	x																	x	
Nudibranchia																											
<i>Acanthodoris pilosa</i> (Abildgaard, 1789)	X	x	x					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Archidoris pseudoargus</i> (Rapp, 1827)	X	x	x	x		x		x	x	x								x	x						x	x	
<i>Cadlina laevis</i> (Linnaeus, 1767)	X	x	x	x				x	x	x	x	x	x	x				x	x	x						x	
<i>Cumanotus beaumonti</i> (Eliot, 1906)	N															n						n					
<i>Cuthona pustulata</i> (Alder & Hancock, 1854)	X																	x	x	x						x	
<i>Cuthona viridis</i> (Forbes, 1840)	X												x	x				x	x					x	x	x	
<i>Dendronotus frondosus</i> (Ascanius, 1774)	X	x	x		x	x	x		x	x	x	x	x	x	x	x	x	x	x	x		x		x	x	x	
<i>Doto coronata</i> (Gmelin, 1791)	X	x	x			x		x		x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	
<i>Eubranchus exiguus</i> (Alder & Hancock, 1848)	X	x	x						x					x		x	x	x	x						x	x	
<i>Eubranchus pallidus</i> (Alder & Hancock, 1842)	X	x						x	x		x	x	x					x	x						x		
<i>Facelina coronata</i> (Forbes & Goodsir, 1839)	S									s									s								
<i>Flabellina borealis</i> (Odner, 1922)	X	x	x				x	x	x				x	x	x					x						x	
<i>Flabellina lineata</i> (Lovén, 1846)	S	s	s	s				s	s		s	s				s	s		s								
<i>Flabellina nobilis</i> (Verrill, 1880)	X													x				x								x	
<i>Flabellina salmonacea</i> (Couthouy, 1838)	N															n										n	
<i>Flabellina verrucosa</i> (M. Sars, 1829)	X	x	x	x			x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
<i>Goniodoris nodosa</i> (Montagu, 1808)	X	x	x								x	x		x		x	x									x	
<i>Jorunna tomentosa</i> (Cuvier, 1804)	S	s	s	s	s	s		s		s	s	s	s	s				s		s							
<i>Limacia clavigera</i> (Müller, 1776)	S	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s							
<i>Onchidoris bilamellata</i> (Linnaeus, 1767)	X	x	x							x	x	x	x					x	x					x	x		
<i>Onchidoris muricata</i> (Müller, 1776)	X	x	x	x		x		x		x	x	x	x	x	x			x	x	x		x	x		x	x	
<i>Palio dubia</i> (M. Sars, 1829)	X	x	x								x	x	x	x		x		x						x	x	x	
<i>Polycera quadrilineata</i> (Müller, 1776)	S	s	s			s		s		s	s	s	s	s	s	s	s	s	s	s							
<i>Tergipes tergipes</i> (Forskål, 1775)	X							x	x	x																x	

Remarks

Our records of this species complement the knowledge of distribution for this species in northern waters, as the records for the sectors 18 and 25 are new.

Cadlina laevis (L., 1767)

Material examined. Kiby, Vadsø (1), 30 mm, VM-201.

Cumanotus beaumonti (Eliot, 1906)

Material examined. Lillevik, Einmoen, Nesna (1), 25 mm, VM-214.

Observations

The single specimen was found in a shallow sandy area with several specimens of the hydroid *Corymorpha nutans* Sars, 1835.

Remarks

This species has earlier been found in 1890 at Sjørøya, Finnmark (sector 22) (erroneously recorded in sector 24 in Høisæter et al. 1997), as the only record from Norway (Odner 1907). Other records and ecological observations are from the British Isles (Picton 1991). The present observation is a new record for sector 16.

Cuthona viridis (Forbes, 1840)

Material examined. Helløya, Kongsøyfjord (3), 15 mm.

Remarks

Records from Bjørnøya (Friele & Grieg 1901), Jan Mayen (Snelli & Steinnes 1975), Iceland (Lemche 1938) and Greenland (Lemche 1941), as well as our new record from Helløya (sector 25) suggest a pan-sectoral distribution for this species, as defined by Brattegard & Holthe (1997:24), and is accordingly changed (Table 2).

Cuthona pustulata (Alder & Hancock, 1854)

Material examined. Helløya, Kongsøyfjord (2), 15 mm.

Remarks

According to our new registration at Helløya (sector 25), as well as previous records in northern Norway (Høisæter et al. 1997), Iceland (Thompson & Brown 1984) and in Svalbard (Evertsen 2001), the distribution pattern for this species is changed to pan-sectoral (Table 2).

Dendronotus frondosus (Ascanius, 1774)

Material examined. Kiby, Vadsø (3), 10 mm, VM-187;

Kongsøya, Kongsøyfjord (1), 20 mm, VM-184; Helløya, Kongsøyfjord (1), 15 mm; Indre Sandvik, Porsangerfjord (1), 15 mm, VM-185; Dyrøysundet, Dyrøy (1), 15 mm, VM-186; Kråka, Borgvær, Vestvågøy (2), 5-10 mm, VM-188.

Observations

D. frondosus was found at all localities except Myklebostad, Sjøna and Lillevik, Nesna. In all cases numerous specimens from 10 to 50 mm were observed spawning. Only once, at Helløya, was a white specimen observed, all others being speckled with brown.

Remarks

This species is common along the whole Norwegian coast (Høisæter et al. 1997). The new record for sector 19 complements this list.

Doto coronata (Gmelin, 1791)

Material examined. Helløya, Kongsøyfjorden (9), 10-20 mm, VM-218; Kråka, Borgvær, Vestvågøy (4), 10 mm, VM-217.

Observations

Small and large specimens, from 5 to 20 mm, were observed spawning at both locations.

Eubranchius exiguus (Alder & Hancock, 1848)

Material examined. Kiby, Vadsø (1), 5 mm, VM-196; Indre Sandvik, Porsangerfjord (10+), 5-15 mm, VM-195; Dyrøysundet, Dyrøy (1), 5 mm, VM-197; Kråka, Borgvær, Vestvågøy (1), 5 mm, VM-194.

Observations

A few specimens of this species were also observed at Myklebostad. At Vadsø and Dyrøy only a few specimens were observed, while in the Porsangerfjord a large quantity of speci-

mens were observed spawning on the hydroid *Obelia longissima* (Pallas, 1766).

Remarks

Due to its small size this species is likely to be overlooked (Evertsen 2001). Only a few records along the Norwegian coast are previously known (Høisæter et al. 1997). The present records in sectors 16, 18, 19 and 24 are new, and indicate that it is more widely distributed than previously known.

Eubranchius pallidus (Alder & Hancock, 1842)

Material examined. Helløya, Kongsøyfjord (1), 15 mm, VM-202.

Remarks

The single specimen found was packed with mature gonads. Earlier Norwegian records suggest a southerly distribution for this species. The present record from the Kongsøyfjord (sector 25) states that this species should have a pan-sectoral distribution (Table 2).

Facelina coronata (Forbes & Goodsir, 1839)

Material examined. Kråka, Borgvær, Vestvågøy (1), 30 mm; VM-211.

Remarks

Previous records for this species is difficult to define, as Odhner (1939) lumped *F. bostoniensis* (Couthouy, 1838) and *F. coronata* as *F. auriculata* (O.F. Müller, 1776). Høisæter et al. (1997) defined *F. auriculata* as *F. bostoniensis*, which is erroneous since the drawings by Müller (1781) fit the description of *F. coronata* as used by Brown (1981). The combination *F. coronata* is used here as it is commonly used in recent literature in opposition to *F. auriculata*. These taxa represents a nomenclatorial problem that has not been dealt with specifically, although the problem is mentioned in the literature (Brown 1981, Høisæter 1986, Picton & Morrow 1994).

Flabellina borealis (Odhner, 1922)

Material examined. Kiby, Vadsø (1), 25 mm.

Remarks

This species is only known from Sweden (Odhner 1922), the Faroe Islands (Lemche 1929) and Norwegian waters (Odhner 1922, 1926, 1939). Microscopy photographs of the radula are included to verify the record of this species (Fig. 2A and B).

Flabellina lineata (Lovén, 1846)

Material examined. Lillevik, Einmoen, Nesna (2), 20-40; VM-215.

Remarks

This species has previously been recorded from Tromsøundet (sector 20) by Schneider (1885), a record lacking in Høisæter et al. (1997). This record is annotated as a new record in Table 2.

Flabellina nobilis (Verrill, 1880)

Material examined. Dyrøysundet, Dyrøy (1), 40 mm; Lillevik, Einmoen, Nesna (9), 20-50 mm.

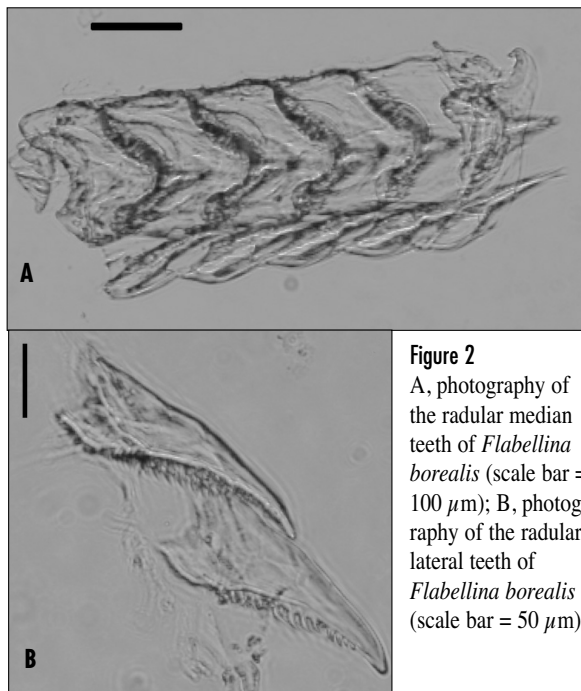


Figure 2
A, photography of the radular median teeth of *Flabellina borealis* (scale bar = 100 μ m); B, photography of the radular lateral teeth of *Flabellina borealis* (scale bar = 50 μ m).

Observations

At Lillevik several specimens were found spawning, and feeding on the hydroid *Tubularia indivisa* L., 1758.

Remarks

The only previous records of this species in Norway are from sectors 13 and 26 (Høisæter et al. 1997), making the present records in sectors 16 and 19 new. It is obvious that this species has been overlooked as the authors have found it frequently in central parts of Norway. This species has been found in the North Sea (Grieg 1913) and at the Faroe Islands (Lemche 1929), and should therefore have a pan-sectoral distribution as indicated in Table 2.

***Flabellina salmonacea* (Couthouy, 1838)**

Material examined. Kiby, Vadsø (1), 30 mm, VM-212; Lillevik, Einmoen, Nesna (1), 40 mm.

Remarks

Previously known only from the Varangerfjord (sector 26) (Høisæter et al. 1997), the present record from Lillevik (sector 16) represents its southernmost record.

***Flabellina verrucosa* (M. Sars, 1829)**

Material examined. Kiby, Vadsø (1), 15 mm, VM-205; Kongsøya, Kongsøyfjord (2), 20 mm, VM-204; Helløya, Kongsøyfjord (1), 20 mm, VM-206; Indre Sandvik, Porsangerfjord (1), 30 mm, VM-203.

Remarks

The new record for sector 24 complement the distribution list for this common species.

***Goniodoris nodosa* (Montagu, 1808)**

Material examined. Kiby, Vadsø (2), 15-20 mm, VM-192.

Remarks

Our new record from Vadsø (sector 26) suggests a pan-sectoral distribution for this species (Table 2).

***Jorunna tomentosa* (Cuvier, 1804)**

Material examined. Kråka, Borgvær, Vestvågøy (1), VM-213.

Remarks

The single specimen found at Vestvågøy (sector 18) represent a new record.

***Limacia clavigera* (Müller, 1776)**

Material examined. Kråka, Borgvær, Vestvågøy (4), 20 mm, VM-220.

Observations

Numerous specimens from 10 to 40 mm in length were observed spawning in the kelp forest at Vestvågøy. Specimens as large as 30 to 40 mm are usually not observed of this very commonly found species. Although also observed from Lillevika it was not collected from the Nordland localities.

Remarks

The new records at Vestvågøy and Lillevik complement the distribution of this common species.

***Onchidoris bilamellata* (L., 1767)**

Material examined. Kongsøya, Kongsøyfjorden (1), 30 mm, VM-216; Helløya, Kongsøyfjorden (1), 30 mm.

Observations

Larger brown speckled specimens, up to 40 mm in length, were observed spawning at both localities in large quantities, among barnacles on bedrock.

***Onchidoris muricata* (O.F. Müller, 1776)**

Material examined. Kongsøya, Kongsøyfjorden (1), 5 mm, VM-190; Helløya, Kongsøyfjorden (1), 5 mm, VM-191.

Observations

Only a few additional specimens were found from these localities.

***Palio dubia* (M. Sars, 1829)**

Material examined. Kiby, Vadsø (2), 7-15 mm, VM-210; Kongsøya, Kongsøyfjord (2), 5 mm, VM-208; Helløya, Kongsøyfjord (3), 15 mm, VM-209; Indre Sandvik, Porsangerfjord (2), 15-25 mm, VM-207.

Observations

In addition to the material preserved, several specimens were also observed at Lillevik. *P. dubia* was in most cases found on the encrusting ectoprocts *Securiflustra securifrons* (Pallas, 1766) and *Scrupocellaria* sp.

Remarks

Our findings at Lillevik (sector 16), the Kongsøyfjord and the Porsangerfjord are new records.

***Polycera quadrilineata* (O.F. Müller, 1776)**

Material examined. Kråka, Borgvær, Vestvågøy (3), 15-20 mm, VM-219.

Observations

Numerous specimens from 5 to 40 mm were found spawning in the kelp forest at Vestvågøy.

Remarks

Records from Lillevika (sector 16) are new.

***Tergipes tergipes* (Forskål, 1775)**

Material examined. Kongsøya, Kongsøyfjorden (1), 5 mm, VM-199; Kråka, Borgvær, Vestvågøy (1), 5 mm, VM-198.

Observations

Several specimens, approximately 5 mm in length, were found spawning on the hydroid *Obelia geniculata* (Pallas, 1776) in the kelp forest at Vestvågøy. A few additional specimens were also observed from the Kongsøyfjord.

Remarks

Our new records from Vestvågøy (sector 18) and the Kongsøyfjord (sector 25) suggest a pan-sectoral distribution along the Norwegian coast for this species (Table 2). Previous records along the coast are restricted to the Bergen area (sectors 7-9) (Høisæter et al. 1997).

DISCUSSION

The papers mentioned in the introduction presents an account of works including nudibranch species from northern Norway. Most records in Høisæter et al. (1997) can be traced back to these, but records of *Flabellina lineata* from sector 20 is lacking, and the record of *Cumanotus beaumonti* in sector 24 is erroneous. Of the 25 heterobranch taxa found, 19 were expected to be found, with previous records from northern Norway (Høisæter et al. 1997). New records for these species merely state their occurrence from this area. Based on new data from this survey the distribution pattern along the Norwegian coast as it is defined in Brattegard & Holthe (1997) is changed for some species. These include *Cuthona pustulata*, *C. viridis* and *Eubranthus pallidus* that are changed from a southerly distribution to a pan-sectoral distribution, and *Flabellina nobilis* from northerly to pan-sectoral (Table 2).

Flabellina borealis was described by Odhner (1922) from material which he previously had placed under *F. verrucosa*. *F. borealis* is characteristic in having the cerata arranged in continuous rows along the back. The radular median teeth are wide with a strong cusp, flanked by 8-10 lateral denticles on each side (Figure 2A). The lateral teeth are long and triangular with a medial edge that has 10-14 long denticles, which extend almost to the distal tip (Figure 2B). Odhner examined most of the material given in Odhner (1922, 1926, 1929, 1939) as referred by Dons (1942a,b,c), and revealed several *F. borealis*, extending its distribution along the Norwegian coast. No other works mentions this species, except Lemche (1929), giving a record from the Faeroe Islands. The other species of *Flabellina* have good descriptions in Kuzirian (1977, 1979) and in Thompson & Brown (1981), and the rediscovery of this flabellinid species add to the knowledge of this group.

Of the remaining species, *Cumanotus beaumonti* is exceptional in being found only once from Norwegian waters, with our record stating its existence from similar habitats as described by Picton (1991). The three remaining nudibranch species, *Facelina coronata*, *Goniodoris nodosa* and *Tergipes tergipes* and the single sacoglossan *Placida* cf. *dendritica*, have previously not been found in northern waters, and should be considered to have a pan-sectoral distribution.

In this survey at eight different localities in northern Norway, it must be noted that a remarkably high number of heterobranch taxa were found, considering the low sampling intensity of only 40 single dives. Although the intention was to collect nudibranchs during this four-man "expedition", there were no specific plans as where to do the investigation, either as specific geographical localities or as specific habitats. Considering these facts it must be pointed out that there have not been any previous surveys specifically looking for nudibranchs in the whole region of Northern Norway by means of using SCUBA diving as

a method. The low number of heterobranchs listed for the different sectors in Høisæter et al. (1997) confirms this.

Based on the new data presented in this survey, it must be concluded that some heterobranch taxa have a wider distribution than previously known. Although a considerable amount of new data compared to the sampling effort in this survey, the results are not sensational, they merely emphasise an under sampling in Northern Norway for this group of molluscs. But they are considerable regarding additional documentation on the distribution and ecology for several species. They also show that choices of methods are essential, and diving has proved to be a necessary tool to investigate heterobranchs.

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SAMMENDRAG

Heterobranchia (Mollusca, Gastropoda) fra Nord-Norge, med merknader på økologi og utbredelse

I løpet av juli 2002 ble det gjennomført totalt 40 enkeltdykk ved åtte ulike lokaliteter i Finnmark (4), Troms (1) og Nordland (3), med tanke på kartlegging av nakensnegler (Nudibranchia). Totalt ble det funnet 24 arter nakensnegler og én annen bakgjellesnegl (Sacoglossa). Arten *Cumanotus beaumonti* ble gjenfunnet for første gang siden 1890 i norske farvann, og forekomst av *Flabellina borealis* er bekreftet. Kartleggingen baserer både nye og eldre funn på sammenstillingsdata for norskekysten tidligere publisert ved hjelp av inndelinger av kysten i sektorer. Mange av funnene er nye for ulike sektorer, og komplementerer en allerede kjent utbredelse. I noen tilfeller er også arter funnet langt fra tidligere kjente lokaliteter. Disse har i enkelte tilfeller gitt grunnlag for å revurdere utbredelsesmønsteret for vedkommende art.

Gjennom undersøkelsene ble det, til tross for en lav innsamlingsinnsats med bare 40 enkeltdykk, funnet til dels store mengder nye data. Dette understreker at flere områder i Nord-Norge er dårlig kjent med tanke på diversitet og utbredelse for gruppen bakgjellesnegler (Heterobranchia). Et forsøk på å inkludere all tilgjengelig litteratur fra Nord-Norge som omhandler denne gruppen er gjennomført.

Gjennom direkte observasjon muliggjort ved dykking har flere interessante økologiske opplysninger bidratt til økt kjennskap

for flere av de omtalte artene. En undersøkelse som dette understreker betydningen av dykking som metode for å studere bakgjellesnegler.

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