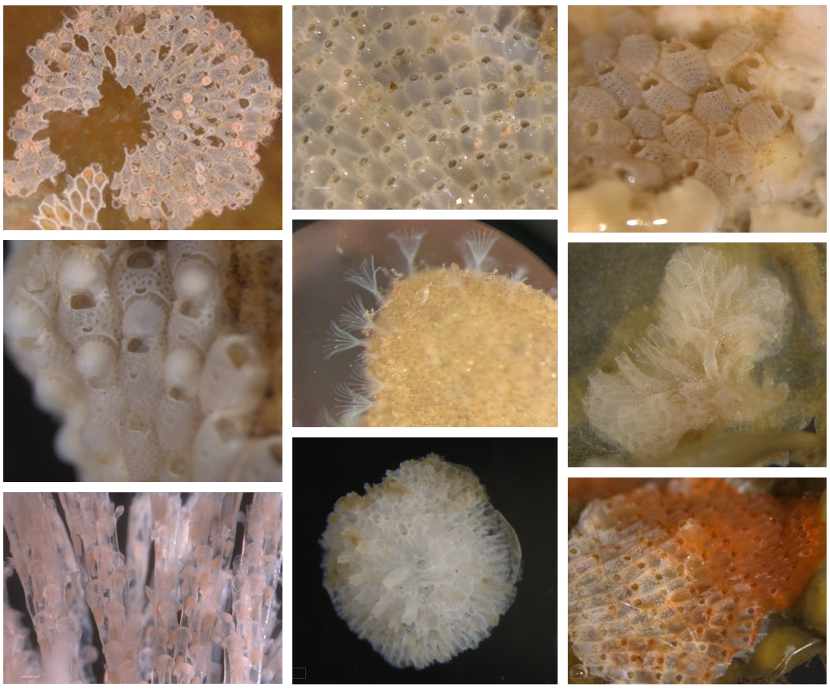
Master's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Information Technology and Electrical Engineering
Department of Natural History

Tine Mathilde Benjaminsen

Bryozoans in shallow water habitats in Norway: New records and DNA barcoding

Master's thesis in Natural Science with Teacher Education
Supervisor: Torkild Bakken
Co-supervisor: Jon Anders Kongsrud
June 2022



Tine Mathilde Benjaminsen

NTNU
Norwegian University of
Science and Technology

Tine Mathilde Benjaminsen

Bryozoans in shallow water habitats in Norway: New records and DNA barcoding

Master's thesis in Natural Science with Teacher Education
Supervisor: Torkild Bakken
Co-supervisor: Jon Anders Kongsrud
June 2022

Norwegian University of Science and Technology
Faculty of Information Technology and Electrical Engineering
Department of Natural History

NTNU
Norwegian University of
Science and Technology

Acknowledgements

This master thesis concludes five years of studies at the Norwegian University of Science and Technology (NTNU). It was written at the Department of Natural History at NTNU University Museum in Trondheim as a part of the project *Invertebrate fauna on marine rocky shallow-water habitats: species mapping and DNA*, supported by the Norwegian Biodiversity Information Centre (grant number 15-18 - 70184240) in partnership with the University Museum of Bergen. It has been both challenging and rewarding to explore the bryozoan species of Norway. I am thankful for this opportunity given to me by my supervisors, Torkild Bakken and Jon Anders Kongsrud. Thank you both for your guidance and motivational words during this process. A special thanks to Jon for assisting me in the genetic analysis and sacrificing time for numerous meetings. I want to thank Karstein Hårsaker, August Nymoen and Ina R. Bjørset for assisting with sampling. I also want to thank Katrine Kongshavn for facilitating the Bryozoa workshop in Bergen and all who attended the workshop. Especially Piotr Kuklinski, Mali Hamre Ramsfjell, and Joanne Porter.

I want to thank my grandfather Guttorm Benjaminsen for awakening my curiosity about marine life from a young age by bringing me on expeditions to the beach. I also want to thank Marthe Ree Dille for making this last year the most fun year of my studies. This experience would not be the same without you!

A final special thanks to my significant other, Kevin Karlsholm Kaldvansvik, for an overwhelming amount of support. Not only during the process of writing this thesis but for the whole duration of my study. Your love and support have been invaluable throughout these years.

Abstract

The studies of bryozoan species in Norway are few and far apart. Most of the research is from the 19th century to the mid 20th century. This thesis set out to contribute to new mapping of bryozoan species along the coast of Norway in shallow water habitats. As well as contribute to the construction of a DNA barcode reference library of Norwegian bryozoan species. Sampling was conducted in three different shallow water habitats; rocky bottom, maerl bed, and artificial. Artificial habitats, such as marinas for recreational boating or large harbours connecting international waters, were deemed interesting because of the high amount of human activity and the possible discovery of alien species.

Bryozoans were sampled from 69 stations along the coast of Norway, from Ørland to Oslo. Approximately 60 different species were recorded. *Electra pilosa* (Linnaeus, 1767), *Membranipora membranacea* (Linnaeus, 1767), and *Cryptosula pallasiana* (Moll, 1803) were frequently recorded in most of the habitats and are characterized as common. About 60% of the recorded species were found in as few as one to two of the locations. Five of the recorded species are considered alien species. These were only recorded from habitats described as artificial. This study represents the first recordings of the alien species *Bugulina simplex* (Hincks, 1886) and *Fenestrulina* cf. *delicia* Winston, Hayward & Craig, 2000 in Norwegian waters. Approximately 31 of the 60 species were sampled for DNA barcoding. With additional DNA barcodes produced during *the Invertebrate fauna on marine rocky shallow-water habitats* (HABFA) project, about 17% of the known Bryozoan diversity in Norwegian waters is represented in the DNA reference library. The ecological role of bryozoans as housing for other animals presented some methodical challenges regarding the sampling of tissue for DNA barcoding. This causes contamination and influences the producing valid DNA barcode sequences.

There is a need for further studies on the bryozoan diversity and species distributions. Sampling in reasonably accessible habitats with simple methods gave extensive results. This should inspire further study of the bryozoan species, to increase the knowledge of bryozoan species diversity and distribution, monitor alien species, and produce a more complete DNA barcode reference library for all the known bryozoan species in Norway.

Sammendrag

Det er få studier om mosdyr i Norge, de fleste er fra 1850-1950. Denne masteroppgaven hadde derfor som mål å bidra med ny kartlegging av mosdyr langs norskekysten i grunne habitater. I tillegg bidra med prøver til DNA strekkoding, for konstruksjonen av et DNA strekkode referanse bibliotek av de norske mosdyr artene. Mosdyr ble innsamlet i tre ulike typer habitat: hardbunn, ruglbunn og kunstig. Kunstige habitat, regnes her som småbåtlag, men også internasjonale havner. Det ble satt et ekstra søkelys på denne habitat typen på grunn av den høye menneskelige aktiviteten i disse områdene, og for mulige oppdagelser av fremmede arter.

Det ble samlet inn mosdyr fra 69 stasjoner langs norskekysten, fra Ørland til Oslo. Omtrent 60 ulike arter ble kartlagt. Der *Electra pilosa* (Linnaeus, 1767), *Membranipora membranacea* (Linnaeus, 1767) og *Cryptosula pallasiana* (Moll, 1803) ble kartlagt i nesten alle lokaliteter og habitater, disse er derfor karakterisert som vanlige arter. Omtrent 60% av de kartlagte artene, var til stede i så få som en til to av lokasjonene. Fem av de kartlagte artene kunne klassifiseres som fremmedarter, disse ble kun kartlagt i habitatene beskrevet som kunstige. Denne studien presenterer også de første funnene av fremmedartene *Bugulina simplex* (Hincks, 1886) og *Fenestrulina* cf. *delicia* Winston, Hayward & Craig, 2000 i norske farvann. Det ble tatt prøver av omtrent 31 av artene for DNA strekkoding. Sammen med tidligere data fra *Evertebrater på hardbunn* prosjektet (HABFA), er omtrent 17% av kjente arter mosdyr i Norge representert i et DNA strekkode referanse bibliotek. Den økologiske rollen til mosdyr som bosted for mange andre organismer, presenterte noen metodiske utfordringer i forbindelse med vevsprøvetaking til DNA strekkodingen. Dette innebar en høy risiko for kontaminering, som igjen minket sjansen for å få produsert gode DNA strekkode sekvenser.

Det er behov for ytterligere studier på diversitet og distribusjon av mosdyr. Innsamlinger i relativt lett tilgjengelige habitat, ved bruk av enkle metoder ga omfattende resultat i denne studien. Dette bør inspirere for videre studier av mosdyr, med mål om å kartlegge mer av diversiteten og distribusjonen, overvåke fremmede arter og produsere et komplett DNA strekkode referanse bibliotek over de kjente artene i Norge.

Table of contents

List of abbreviations

HABFA	Invertebrate fauna on marine rocky shallow-water habitats
PolyPort	Polychaetes in Norwegian Ports
NTNU-VM	NTNU University Museum
ZMBN	University Museum of Bergen
BOLD	Barcode of Life Database
NorBOL	Norwegian Barcode of Life
IBOL	International Barcode of Life
COI	Cytochrome *c* oxidase subunit 1
NBIC	Norwegian Biodiversity Information Centre
SEM	Scanning electron microscope
Sp.	Species, used when genus is known but not species
Spp.	Species, plural form
Cf.	Conferre, the specimen probably belongs to the identified species
Indet.	Indeterminable beyond a certain taxonomic level

1. Introduction

1.1 Knowledge status of Bryozoans in Norway

This master's project is part of the bigger project *Invertebrate fauna on marine rocky shallow-water habitats* (HABFA). One goal of this project is to expand the knowledge of the Bryozoa phylum (NBIC, 2019). The bryozoan species are considered problematic and challenging to identify. Therefore, they are often neglected and overlooked in environmental monitoring surveys. The overlooking of bryozoans has long been an issue and was stated by Nordgaard (1894):

«hvis man ikke under skrabninger netop søger efter polyzoer, kan de let oversees»

Most of the comprehensive research on the distribution of this phylum in Norway is from around the 19th century and the mid 20th century. Ole Nordgaard (1862-1931), a Norwegian conservator, marine biologist, and zoologist, made an overview of the then present species of Bryozoa, then called Polyzoa, in 1894 (Nordgaard, 1894; Sakshaug, 2009). Afterward, Immanuel Vigeland (1917-2004), a Norwegian bryozoologist was awarded a state grant. This made it possible for him to conduct a comprehensive study of bryozoans in all the Norwegian natural history museums in the mid 20th century (Hansson, 1997). In the NTNU University Museum in Trondheim, Immanuel Vigeland identified 6850 objects of bryozoans covering a significant amount of the total amount of different species present in Scandinavia (Bakken et al., 2022). The British scientist John S. Ryland made an effort to increase the knowledge on the distribution of bryozoan species. He conducted a study on the western coast of Norway (Bergen) in 1959-1960, collecting and identifying bryozoans (Ryland, 1963). The most recent mapping of species in Norway was done in 2014 by Porter et al. (2015), with fouling species being the focus, and ascertaining whether any alien species were present. Two alien species not yet discovered in Norway were then recorded.

There is a big leap from Ryland's work in the 1960s to the work of Porter et al. (2015). This leap emphasizes the lacking knowledge of the bryozoan species in Norway. The work of Porter et al. (2015) was needed, and the discovery of two species new to Norway emphasizes and further affirms the need for new mapping of bryozoan species in Norway. This since most of the knowledge on bryozoan species distribution in Norway is outdated and therefore weak.

This is confirmed in the recent *Knowledge Status for Species Diversity* Report produced by the Norwegian Biodiversity Centre, where the knowledge status of the Bryozoa phylum is characterized as weak (Elven & Søli, 2021). Taxonomy, distribution, and ecology are graded on a scale from 0 to 5, where 0 is no knowledge, and 5 is secure knowledge. The knowledge of the taxonomy of Bryozoa is graded as 3, meaning it is acceptable. Knowledge on distribution is graded as 2, characterized as weak. There are only sporadically recordings of some species, providing limited insight into the total distribution. Lastly, knowledge of ecology is graded as 1, meaning that significant knowledge on way of life and interaction with other organisms is poorly known (Elven & Søli, 2021). It is stated in the report that there are 292 confirmed species in Norway. This includes both marine and freshwater species. Furthermore, the estimated number of present species is 371, meaning we know 79% of the total species (Elven & Søli, 2021).

1.2 Basic marine bryozoan biology

Bryozoa are a phylum of aquatic sessile invertebrates. There are two marine classes of Bryozoa. Stenolaemata, which contain one single order, Cyclostomatida. And Gymnolaemata, which include the two orders: Cheilostomatida, which is highly calcified, and the uncalcified, gelatinous Ctenostomatida (Ryland, 2017). However, recent studies have discovered that there is no genetic distinction between these two orders (Porter, 2012). Nevertheless, since the calcification or lack of it separates them, it is kept like this here, for easier classification. Figure 1 illustrates the relationship between the orders.

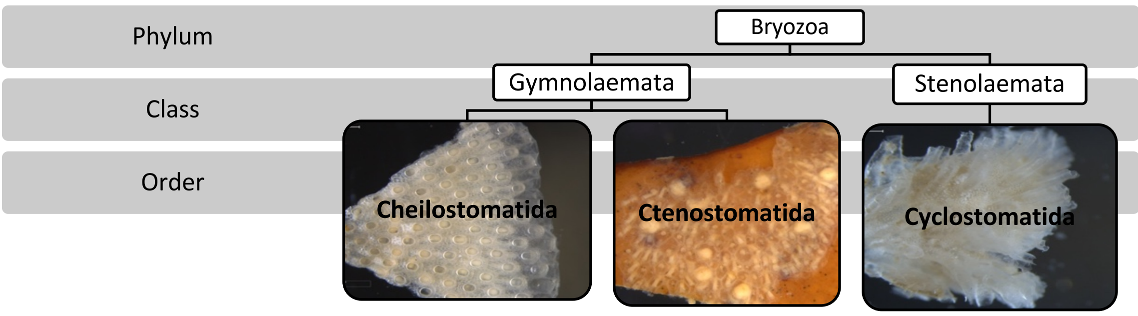


Figure 1: Classification scheme for the Bryozoan phylum. Photos of one species from each order, to illustrate the diverse morphology. From left to right, *Cryptosula pallasiana, Alcyonidium gelatinosum, Tubulipora* sp. Illustration: Tine Mathilde Benjaminsen.

1.2.1 General structure

They are colony forming, consisting of clonal individuals called zooids. These grow continuously by non-sexual budding, starting from a single ancestrula. There are different types of zooids. Autozooids are feeding zooids; these are functionally independent and are equipped with a feeding lophophore, gut, and reproductive organs. Heterozooids, on the other hand, are polymorphic specialized zooids; such as avicularium (Hayward & Ryland, 1999). Avicularium are known to have a defence mechanism (Winston, 1984). Colonies can consist entirely of autozooids or can include various types of heterozooids (Hayward & Ryland, 1999).

Bryozoans feed using an eversible **lophophore**; this is bell-shaped and have ciliated tentacles that create water currents, driving food towards the mouth (Fig. 2) (Hayward & Ryland, 1999; Lombardi et al., 2014). The lophophore protrudes out from the **orifice** when feeding and swiftly retracts within the tentacle sheath using retractor muscles. When retracted, the orifice can be closed by an **operculum** in some species. The lophophore retracts using **retractor muscles,** which is a fast operation. **Parietal muscles** are used for the eversion of the lophophore (Fig.3) (Hayward & Ryland, 1999).

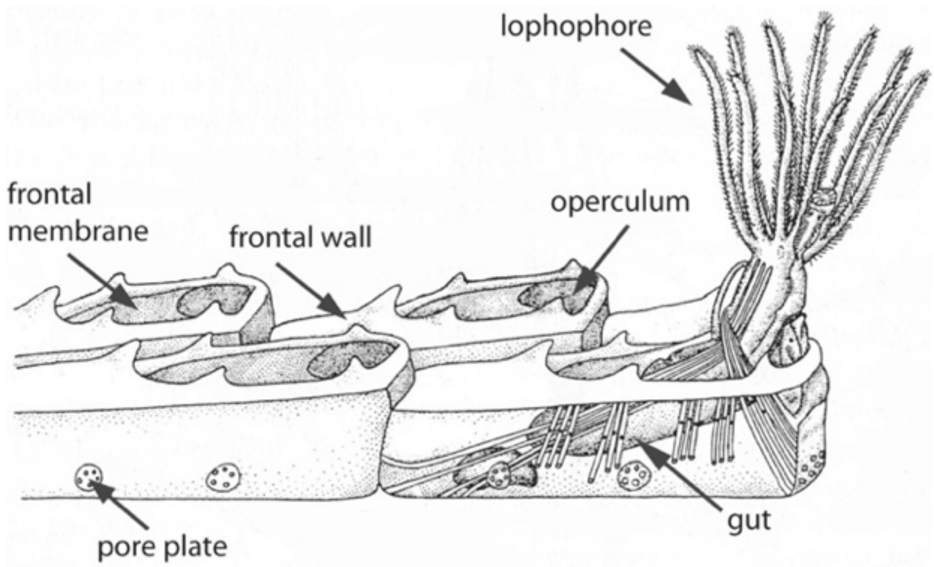


Figure 2: Schematic illustration of cheilostome bryozoan morphology. Box-shaped autozooids with lophophore expanded for eating purposes. Illustration (Taylor et al., 2015)

The **gut** is U-shaped, with an anus situated at the base of the lophophore. The lophophore, gut, and associated muscles are often referred to as the **polypide**. The rest of the zooid is termed the **cystid**. The zooids have a network of tissue strands within the body cavity, densest around the gut. This network is called the **funiculus** and branches to communication **pores**, linking adjacent zooids. This system transports metabolic products, from feeding to non-feeding zooids or autozooids that no longer can feed. However, this network is poorly developed in the Cyclostomatida, where it does not link adjacent autozooids (Hayward & Ryland, 1999).

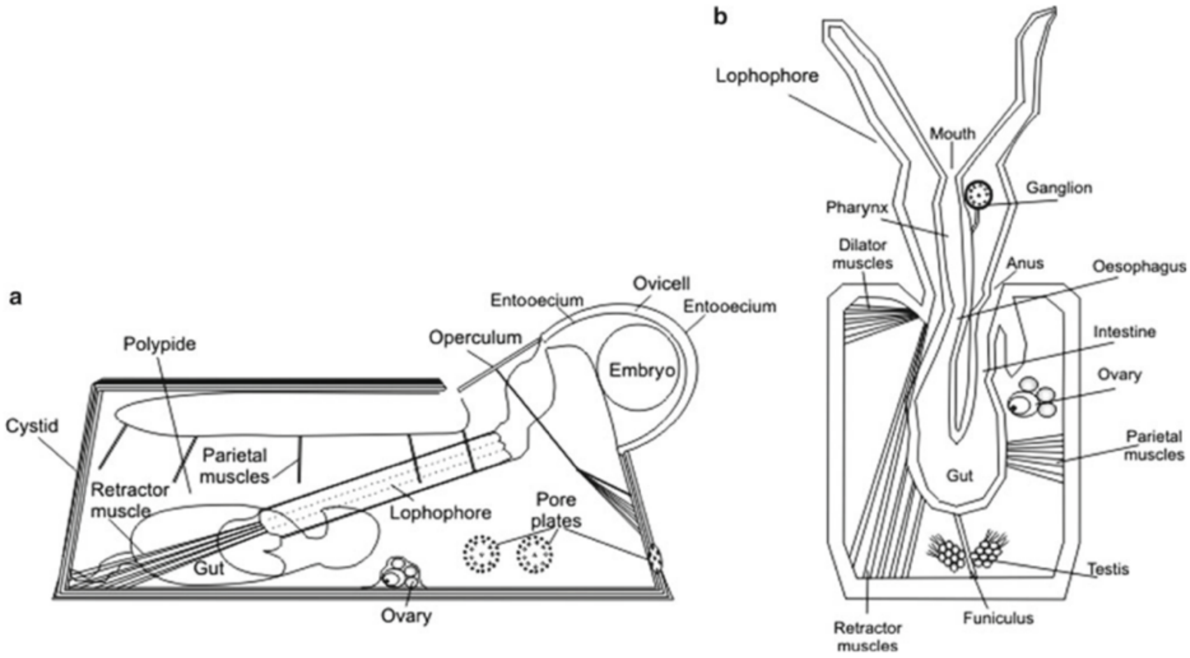


Figure 3: Schematic illustration of zooid, from (Lombardi et al., 2014) adapted from (Hayward & Ryland, 1999)

1.2.2 Reproduction

All bryozoan colonies produce both male and female gametes, therefore characterized as hermaphroditic. The Ancestrula is the first zooid, which is a result of metamorphosis from a sexually produced larva (Hayward & Ryland, 1999). To prevent self-fertilization, sperm is released into the water through pores in the tentacles. It is believed that chemical signalling is used to guide the sperm towards other colonies. The sperm is then entered into the other colony through pores in an appropriate lophophore, and then the eggs can be fertilized internally in the zooids (Porter, 2012). There are two main strategies of reproduction in the bryozoans; broadcasting and brooding. **Broadcasting** is when 50-80 fertilized eggs are spawned directly into the water and then develop into a larva that uses several days before it settles onto a surface. **Brooding** is when 1-15 eggs are brooded until fully developed larvae; these larvae settle quickly after spawning (Porter, 2012). Cheilostomes are known to develop **ovicells**, which are special brood chambers where one embryo at a time is brooded (Hayward & Ryland, 1999). Ovicells are often used as a morphological trait to identify species, but they are present mainly when the colony is in a reproductive period (Hayward & Ryland, 1998). Little is known about the seasonality of reproduction of bryozoans (Porter, 2012).

1.2.3 Ecology

The different species grow in various formations of the colonies; many grow as flat and encrusting sheets. Some grow in upright fanlike formations or like bushes (Hayward & Ryland, 1999). In Figure 4, the different structures of colonies in the Cheilostome order are represented. Bryozoans have been recognized as important habitat-forming organisms. Both by constructing the framework by itself and in combination with other organisms. They therefore play a central role in the marine ecosystems, acting as habitats for a diverse group of organisms (Lombardi et al., 2014). Gordon (1972) illustrated this epifauna settled on and in the bryozoan colony (Fig. 5.) He discussed the biological relationships of intertidal bryozoans in New Zealand, such as what organisms that feed on bryozoans. Bryozoans are known to be a food source for gastropods, fish, echinoids, crustaceans, asteroids, ophiuroids, chitons, and polychaetes. Nudibranchs being the predominating gastropod (Gordon, 1972; Lidgard, 2008; Miller, 1961).

Figure 4: Different colony structures of the Cheilostomes. Illustration: (Porter, 2012)

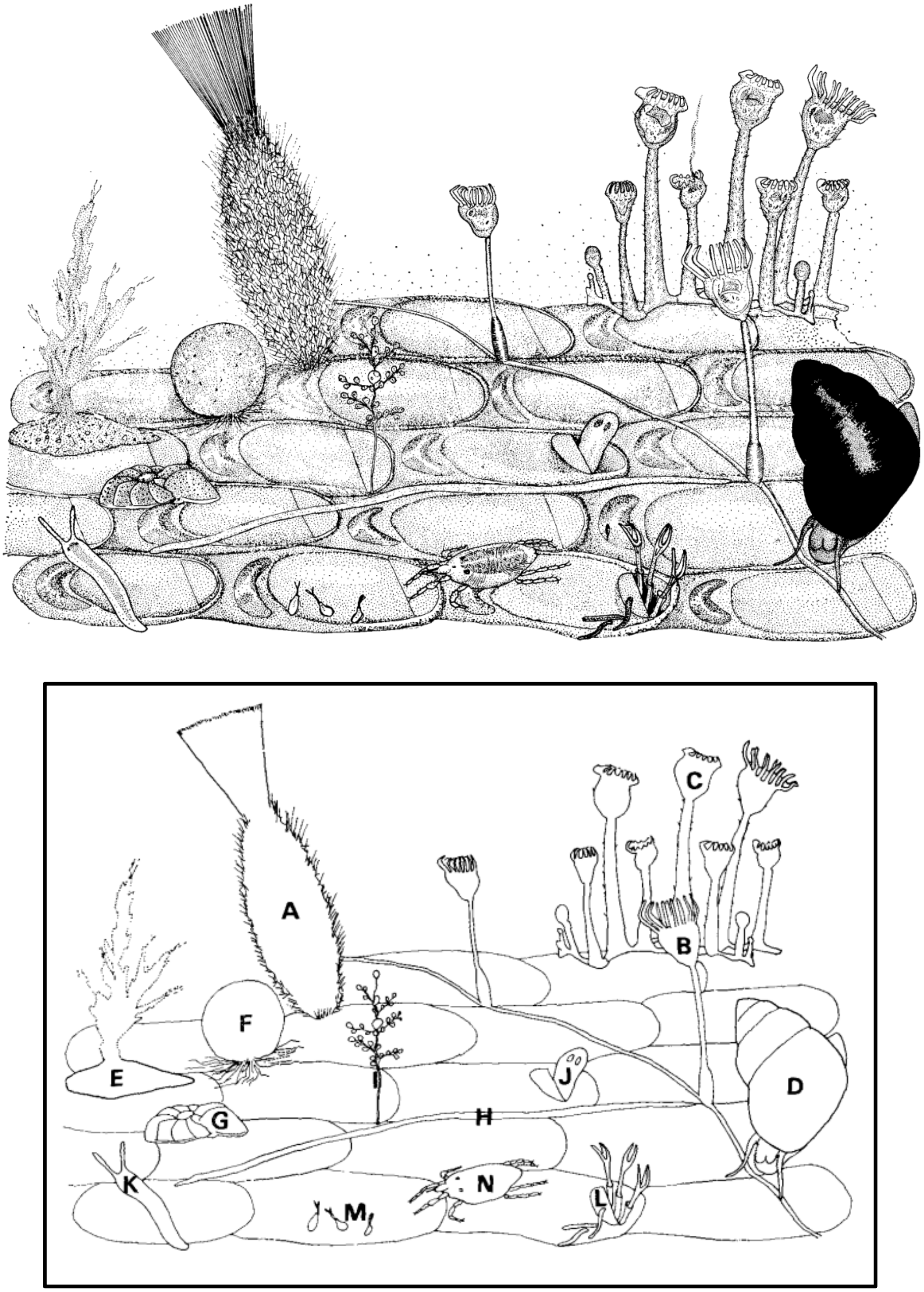


Figure 5: Epifauna associated with a bryozoan colony. (A) Porifera, (B) Entoprocta, (C) Entoprocta, (D) Prosobranchia, (E) Protozoa, (F) Protozoa, (G) Protozoa, (H) Protozoa, (I) Protozoa, (J) Platyhelminthes, (K) Platyhelminthes, (L) *Lagotia expansa*, adults and swimmers, (M) Folliculinidae ("bottle-animalcule"), (N) Marine mite. Illustration: (Gordon, 1972).

Some bryozoans are fouling animals, covering artificial substrates such as boats, ropes, and pontoons. This fouling, especially on movable objects such as boats, may result in cosmopolitan distribution of fouling species. Facilitated by human movement, such as aquaculture and shipping (Porter, 2012). This can cause species originally described in Japan to get a way of passage to Norway, which likely would not happen without human activity. Some of these foreign species can establish in the new region and cause problems for native species, and ecosystems by restructuring the trophic web (Porter et al., 2015). In this study, species outside their natural geographical area that cause damage like this, either ecological or economical will be termed invasive species (Lockwood et al., 2013). The term alien species is here referring to species outside their natural geographic range and dispersal potential, caused by human impact (NBIC, 2018). This is the term recommended by NBIC.

In 2015 scientists from Heriot Watt University and the Natural History Museum, London, conducted a research cruise from Bergen to Trondheim. The survey intended on mapping invasive species along the coast of Norway. By using the vessel *MV Halton* they moored up in the major harbours of Bergen, Ålesund, Kristiansund and Trondheim. They identified seven fouling bryozoan species, two of them being the first confirmed records of the alien species *Tricellaria inopinata* d´Hondt & Occhipinti Ambrogi, 1985 and *Schizoporella japonica* Ortmann, 1890 (Porter et al., 2015).

The Norwegian Biodiversity Information Centre (NBIC) assessed alien species present in Norway first in 2012 and published this as the Norwegian Alien species list. The Alien species list poses as an overview of alien species in Norway and assesses the risk that these introduced species pose for the Norwegian ecosystems. There were no records of alien bryozoan species in this first publication, but four species were considered doorknockers (Gederaas et al., 2012). *Doorknockers* are species that are expected to arrive in Norwegian waters yet to be recorded (Porter et al., 2015). In the research cruise from 2015, the doorknocker species, *T. inopinata* as well as *S. japonica,* which were not yet considered as a doorknocker species, were recorded. The last version of the alien species list was published in 2018. In this seven bryozoans were mentioned, whereas the two found in the research cruise are characterized as alien species (NBIC, 2018). See table 1, for a list of these species, with their risk classification and assessment status.

Table 1: Bryozoan species listed in the Alien species list (NBIC, 2018)

Scientific name	Risk classification	Assessment status
Tricellaria inopinata	SE - Very high risk	Alien species
Bugula neritina (Linnaeus, 1758)	LO - Low risk	Doorknocker species
Watersipora subatra (Ortmann, 1890)	HI - High risk	Doorknocker species
Bugulina stolinifera (Ryland, 1960)	LO - Low risk	Doorknocker species
Schizoporella japonica	HI - High risk	Alien species
Victorella pavida Saville-Kent, 1870	NR - Not risk assessed	Not Alien species
Watersipora aterrima (Ortmann, 1890)	NR - Not risk assessed	Doorknocker species
Schizoporella japonica (Svalbard)	LO - Low risk	Doorknocker species

Porter et al. (2015) had some recommendations for species that should be considered as doorknocker species in the alien species list. These were: *Bugulina simplex* (Hincks, 1886), *Fenestrulina delicia* Winston, Hayward, and Craig, 2000, *Pacifincola perforate* (Okada and Mawatari, 1937), and *Smittoidea prolifica* Osburn, 1952.

1.4 Morphological identification of bryozoans

Some characters and features of the three orders often used for morphological identification are presented here. The main emphasis is on the Cheilostome order.

1.4.1 Cheilostomatida

Cheilostomes consist of box-shaped, calcareous zooids, where most of the species grow as encrusting sheets, but some also in erect and branching formations. See Figure 4 for different colony formations. Cheilostomes are often characterized by the calcification of the frontal skeleton (Fig. 6). Structures like spines and pores are used to separate the different species (Fig. 6) (Hayward & Ryland, 1999). Some species have an avicularium, which can aid the identification process (Fig.6, Fig.

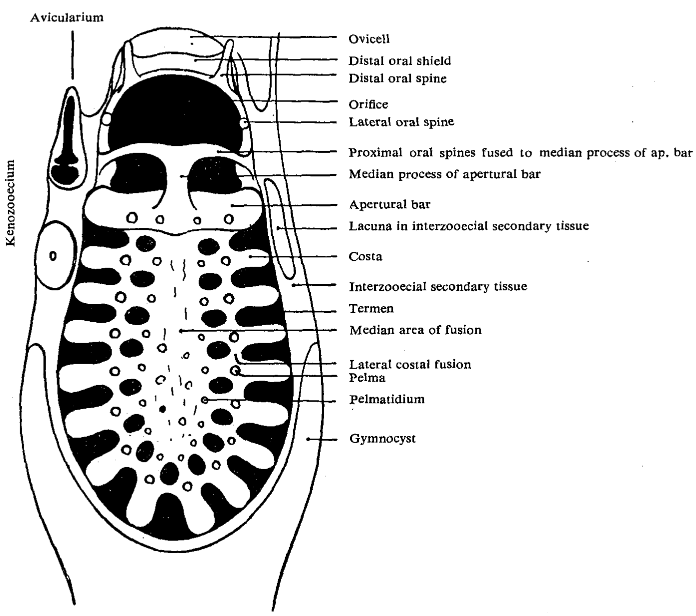


Figure 6: Schematic diagram of a cribrimorph bryozoan to show the different structures (Lang, 1921)

7A). Calcification and structure of reproductive structures such as ovicells is often used in identification (Fig. 7B).

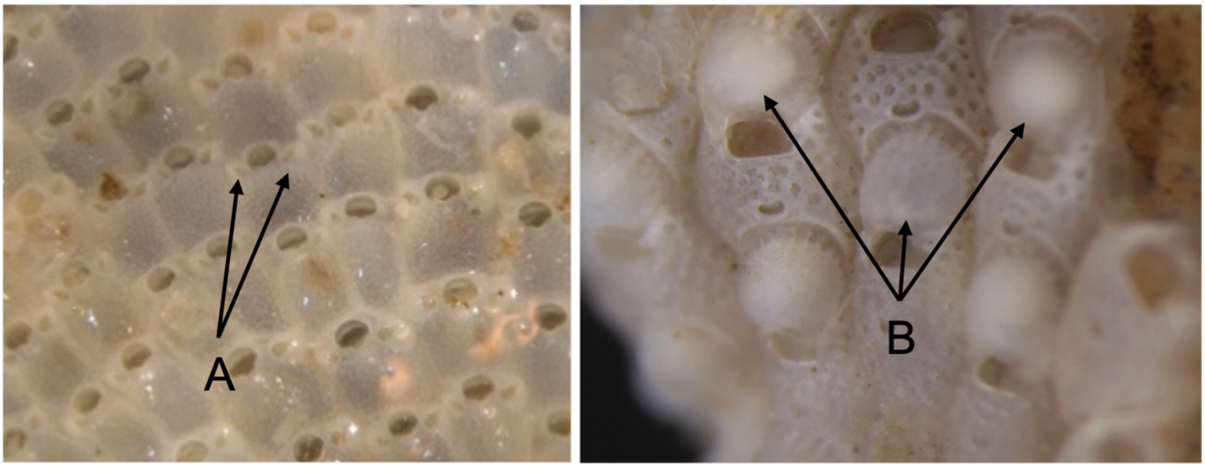


Figure 7: (A) Avicularium on *Schizoporella* sp, (B) *Fenestrulina malusii* with ovicells. Photo: Tine Mathilde Benjaminsen

1.4.2 Ctenostomatida

Ctenostome species do not have a calcified exoskeleton; they are gelatinous, chitinous, or composed of a soft membrane (Fig. 8). The zooids are box-shaped like the Cheilostome but always lack an operculum. Colonies grow encrusting or free and branching from a stolon (Hayward, 1985).

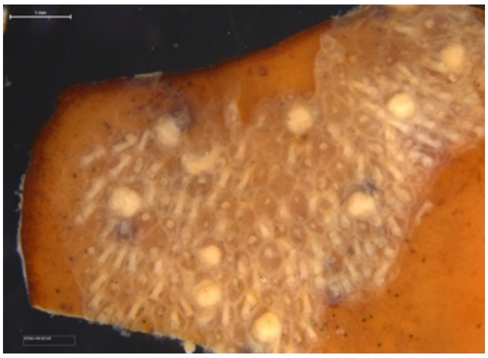


Figure 8: Ctenostome, *Alcyonidium gelatinosum* (NTNU-VM 82120). Photo: Tine Mathilde Benjaminsen

1.4.3 Cyclostomatida

Cyclostome colonies are typically made of highly calcified, tubular, elongated zooids. Colonies can grow in disc-like or lobular encrusting formations (Fig. 9A) or erect. Zooids elongate cylindrical tubes and continue to lengthen through ontogeny (Hayward & Ryland, 1985). Brood chambers are called gonozooids and can be used in identification (Fig. 9B). Some of the cyclostome genera are characterized as challenging to identify, as *Tubulipora,* which seldom is identified to species level (Fig. 9).

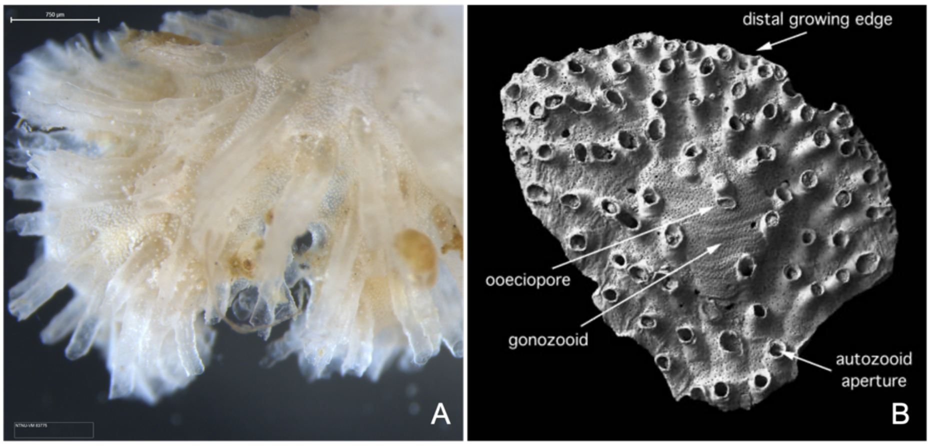


Figure 9: (A) *Tubulipora* sp. (NTNU-VM 83775). (B) Gonozooid and structures of *Tubulipora* sp. Photo A: Tine M. Benjaminsen. Photo B: (Taylor, 2001)

1.5 DNA Barcoding

DNA barcoding uses reference genes for large scale screening to assign specimens to species, and therefore it also opens for the discovery of new species (Moritz et al., 2004). The Barcode of Life Data Systems (BOLD) ID engine (Ratnasingham & Herbert, 2007) uses sequences from the 5' region of the mitochondrial gene COI (cytochrome c oxidase subunit I gene) for animal identification. It will, when possible, return species level identification by comparing the specimen DNA to a library of DNA barcodes of a known taxonomy (Hebert et al., 2005). This constructed DNA library can then be used in combination with metabarcoding, which allows for identification of many taxa in the same sample. For example, identifying the species composition in environmental DNA (eDNA), such as water, air, and sediment samples. From this pool of genetic material, one can then link these to DNA in the DNA library (Seymour, 2021). The advantages of DNA barcoding are many, one of them being that we get identifications that are a lot more objective and faster than humans can produce (NorBOL, 2021b).

Internationally there has been an effort to generate DNA barcode sequences of as many species as possible in the International Barcode of Life (IBOL). Norway, a member nation of IBOL, has its own Norwegian Barcode of Life (NorBOL). The goal is to generate DNA barcodes and to make these available in Barcode of Life Data Systems (BOLD), including metadata and pictures (NorBOL, 2021a). All in effort to increase the knowledge of biodiversity. NBIC contributes with funding and support for different species projects, which in turn contribute to NorBOL by increasing the library, HABFA being such a project. Therefore one goal of the

HABFA project is to contribute with DNA barcodes of marine invertebrates to BOLD (NBIC, 2019).

Another advantage of DNA barcoding is that one gets the possibility of discovering cryptic species. These are morphologically indistinguishable species, but when barcoded, considerable genetic disparity is manifested, which means that these species can only be recognized by molecular data (Korshunova et al., 2019).

1.6 Aims of the study

This study's main aim is to increase the current knowledge on the bryozoan species composition along the shallow coast of Norway, in depths shallower than 25 meters in the littoral and upper sublittoral zone. This is done through sampling and by identifying samples gathered in earlier projects (PolyPort). One of the HABFA project's main goals is to contribute to the making of DNA libraries of bryozoan species, making it easier for future generations to conduct environmental surveys by doing metabarcoding.

Aims clearly stated:

- Provide new updated information about occurrence and distribution of bryozoans in shallow Norwegian water habitats; artificial, maerl bed and rocky bottom.
- Contribute to the construction of a DNA barcode reference library for bryozoans in Norwegian waters
- Assess the distribution of alien species along the coast.

2. Methods

2.1 Study area and distribution

This master's project is limited to the shallow parts of the coastal shores of Norway, following most of the parameters of the HABFA project, except for an added limitation of a maximum depth of 25 m. Samples are concentrated in the areas around Ørland in Trøndelag, Bergen in Rogaland, and one sampling in Kristiansund, Møre og Romsdal. These samples are represented as red points in Figure 10. The sampling conducted on the rocky beaches was done during low tide. Sampling on harbours and piers was not affected by the changing tides. However, recent cleaning of fouling on pontoons had to be considered since this would result in little material to sample.

To ensure data over a wider geographical distribution along the coast of Norway, samples from the *Polychaetes in Norwegian Ports: Uncovering Diversity in Coastal Anthropogenic Environments and Assessing Cryptogenic and Non-indigenous Species* (PolyPort) project were included. These are samples from the southern coast of Norway, from areas such as Stavanger, Kristiansand, and Oslo. These samples are from the same habitats and depths investigated in this study, represented as blue points in Figure 10.

There are 69 samplings in total, including PolyPort, which means that multiple samplings were conducted in every location.

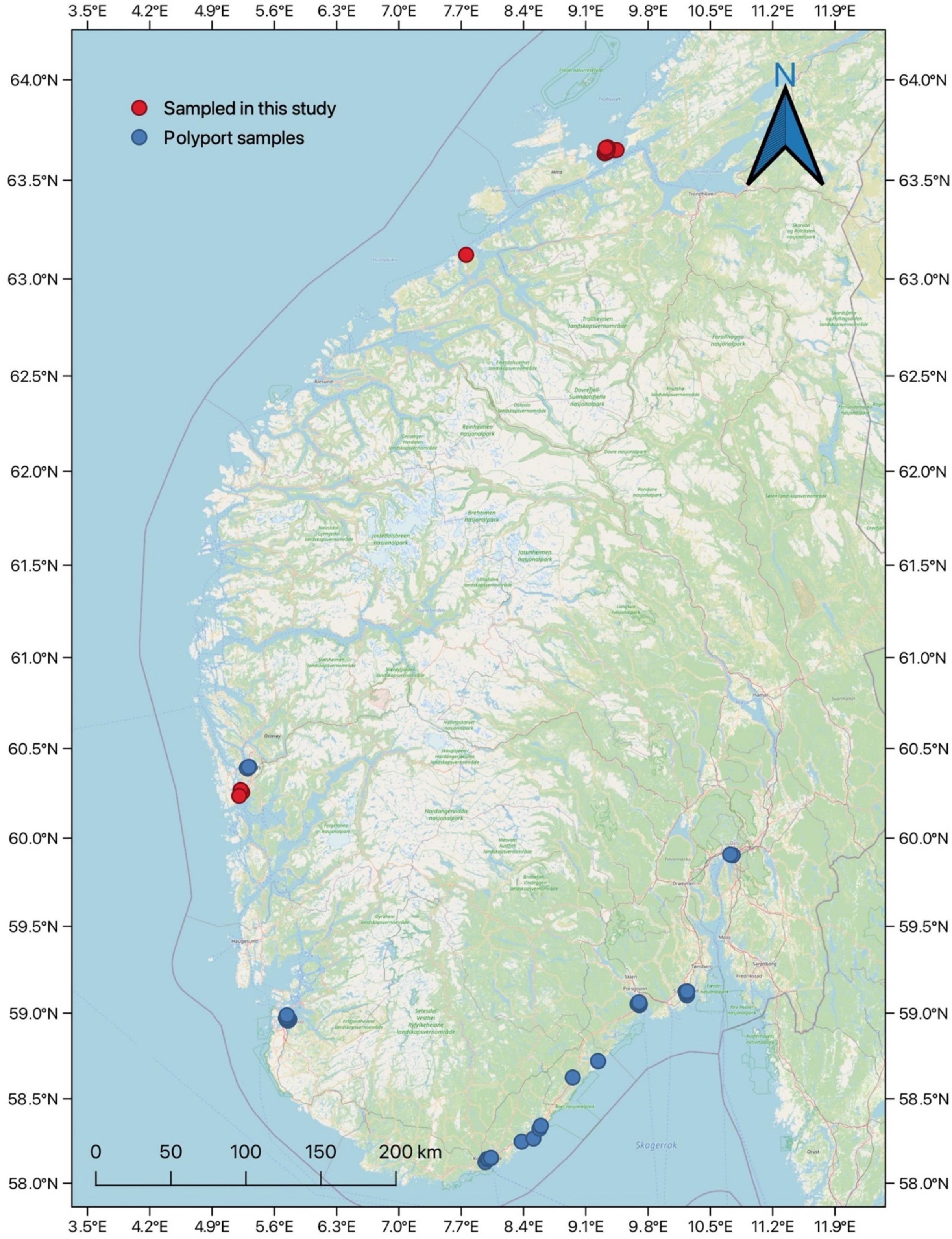


Figure 10: Illustration of sampling locations. Sampling conducted in the span of this study is marked in red, and earlier sampling done in the PolyPort project is marked in blue. Map sourced from QGIS.

2.2 Samples and sampling methods

Samples were collected by hand-picking or using small hand-held tools, like paint scrapers or bigger scrapes with a dip net. Samples in depths down to 25 meters were collected while snorkelling or using a triangular dredge from a research vessel. Samples were either fixated on 96% ethanol in the field or transported in seawater back to the lab for further sorting and fixation. Bryozoans live attached to many different substrates and are often difficult to spot with the bare eye. Therefore, it was of great importance to sample a variety of substrates for further inspection in the laboratory.

The sampling was conducted in three different habitat types: Rocky bottom, artificial, and maerl bed. **Artificial habitat**, harbours, piers, marinas, and other man-made habitats. Mostly sublittoral. **Maerl bed habitat**, sublittoral habitat with substrate consisting of the unattached nodules of coralline alga, maerl (rhodolith) (Perry, 2018), habitat here affected by currents and movement of the nodules. The currents also transport other organisms (e.g., different types of red and brown macroalgae) to this habitat (Perry, 2018). And lastly **Rocky bottom habitat**, rocky beaches, and slopes in the littoral and sublittoral zone.

Some fieldwork was conducted for this master's project. Firstly, a fieldwork in Kråkvåg, Ørland. The primary collecting method was intertidal walks, where various invertebrates were collected by a team of people walking the shores (Fig. 11A). Some samples were also gathered from a harbour in the area. These samples were put in seawater for further sorting. *R/V Gunnerus* was used in Kråkvågsvaet, an area with Maerl bed substrate, and sampled using a triangular dredge. The samples from the dredge were put directly on 96% ethanol for further sorting in the laboratory. Sampling in the Bergen area surrounding the marine biological station in Espegrend was conducted during a Bryozoa workshop. Here specimens were collected from different harbours (Fig. 11B) and from an area with maerl bed substrate; this was collected with a triangular dredge from *R/V Hans Brattstrøm.* Sampling in Kristiansund was also executed; here, bryozoans were sampled from rope and pontoons on a marina.

Figure 11: Typical sampling locations, (A) rocky bottom habitat, (B) artificial habitat. Photo: Ina R. Bjørseth and Tom Alvestad.

Samples from PolyPort were also included. This was samples identified as "Bryozoa" stored at NTNU University Museum, where an extensive effort to further identify this material to the lowest possible taxa was made in this study. Barcoding results of samples from earlier in the HABFA-project were used; these samples cover extensive parts of Norway's coast and are mainly from the University Museum of Bergen.

All samples are stored at the NTNU University Museum (NTNU-VM) (Bakken et al., 2022) and the University Museum of Bergen (ZMBN) (Kongsrud et al., 2022) in 96% ethanol. In Appendix I all samples are represented.

2.3 Morphology

Morphological characters of the specimens were used to identify the specimens to the lowest taxa possible. This was done using a WILD HEERBRUGG and Olympus SZX16 stereo microscope and by using the following literature for descriptions and identification keys of each species: *Bryozoa in Handbook of the marine fauna of North-West Europe* (Ryland, 2017), *Cheilostomatous Bryozoa Part 1* (Hayward & Ryland, 1998), *Cheilostomatous Bryozoa Part 2* (Hayward & Ryland, 1999), *Cyclostome Bryozoans* (Hayward & Ryland, 1985), *Ctenostome Bryozoans* (Hayward, 1985). The nomenclature follows the accepted taxonomy of World register of marine species (WoRMS Editorial Board, 2022).

Pictures were taken using Leica MC170HD and Leica DMC5400 cameras attached to stereo microscopes Leica M165C and Leica MZ16A, respectively, and using the Leica Las X software. An Olympus SZX16 stereo microscope with the Toup View software was also used for picture taking. This includes the images of samples used for DNA barcoding.

Scanning electron microscopy (SEM) pictures are a great asset to morphological identification. When performing SEM scanning, one removes the specimen's tissue and scans the specimen using a focused beam of electrons; the electrons interact with the atoms in the specimen, producing topographic information about the sample. This information is used to produce a picture (Mohammed & Abdullah, 2018). When the tissue of the specimen is removed, calcifying structures get more prominent. Furthermore, one produces close-up pictures of structures such as ovicells or avicularium (Fig 29B, 31B). Special and expensive equipment is needed for this, and it is time consuming. The use of SEM was therefore not prioritized in this study. However, some SEM pictures from other studies have been used to clearly show morphological features challenging to see in regular photos from a stereo microscope.

One can discuss the guarantee of safe and correct identification with limited time learning and getting to know this phylum. Some samples were confirmed or identified by Bryozoan experts Dr. Joanne Porter and Prof. Piotr Kuklinski, which increases the possibility of valid identification. This was done during a Bryozoa workshop in Bergen in February 2022.

2.4 DNA Barcoding

A variety of species were sampled for DNA barcoding, with more than one specimen of each species when possible. It was also decided that it would be advantageous for this project to sample specimens of the same species but from different geographical areas, with the intention of possibly finding genetic differences. Samples from Bergen and Ørland were chosen for DNA barcoding. Some of the Bergen samples were sampled fresh still in salt water, while the samples from Ørland were fixed in ethanol beforehand. To get a full tray of samples, earlier sampling from the HABFA project was also used. Some of these samples are from other habitats and depths than this study. When performing sampling of tissue, a clean part of the colony was separated from the rest (Fig. 12A) to avoid pollution from other organisms, and to leave a part of the colony to serve as a voucher.

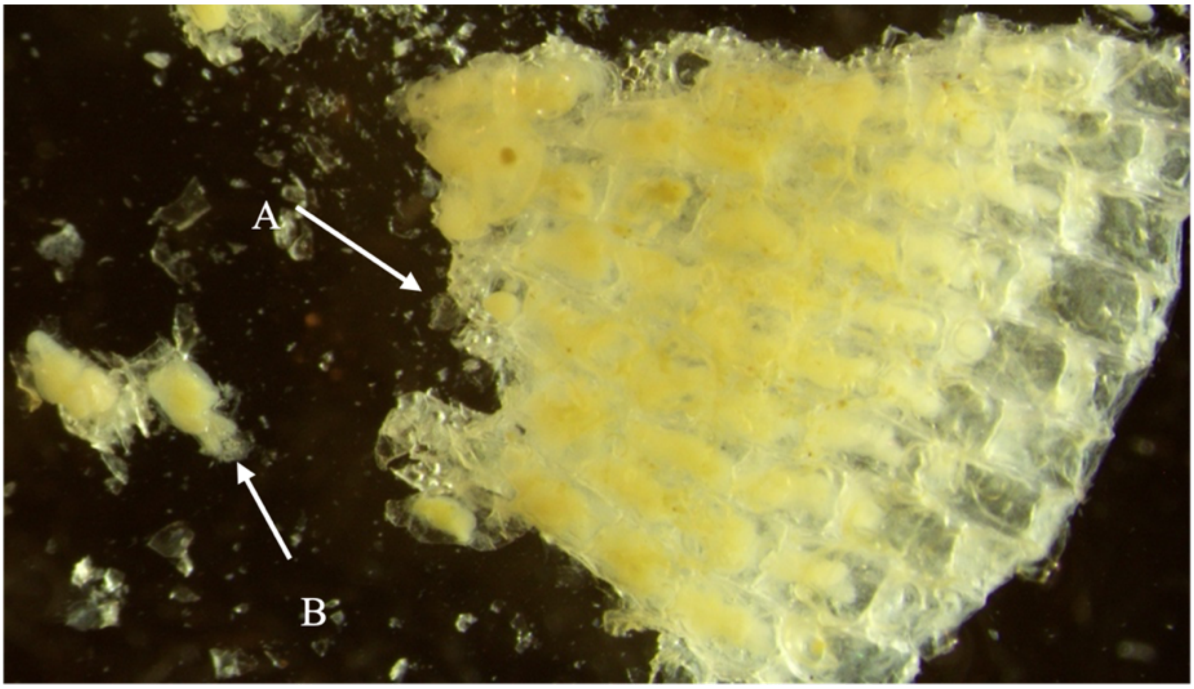


Figure 12: Part of *Cryptosula pallasiana colony* (NTNU-VM 82091) basal view of colony, picked apart for tissue sampling. (A) Part of the colony removed from the rest, (B) polypide plucked out of colony. Photo: Tine Mathilde Benjaminsen.

The chosen part was picked apart to uncover the tissue. To get a substantial amount of tissue, one had to take more than one polypide. There were significant variations in the difficulty of this operation in the different species. In many of the specimens one could see the polypide and pick it out, while the tissue was small or destroyed in other specimens and therefore hard to spot after picking the calcified exoskeleton apart. In Figure 12B, an example of tissue extracted from a *Cryptosula pallasiana* colony is illustrated. This was one of the species manageable to extract tissue from.

2.5 Analysis of DNA results

In BOLD, a neighbour-joining (NJ) tree was generated in the Taxon ID Tree analysis using the Kimura 2 parameter distance model and the amino acid based BOLD aligner (Ratnasingham & Herbert, 2007). The project, specimen ID, and identifier were included in the tree. Contaminants, sequences with stop codons, and records flagged as misidentifications and errors were excluded in the final tree. The NJ tree illustrates differences between species by being organized into different clades. One species' clade is expected to be separated from other clades by a distance of 2% or more (Hebert et al., 2003). The final trees were generated in the software MEGA v. 10.0.5, where these deviating results were excluded.

3. Results

The main results of this study are the recorded species in the different locations. Observations of habitats and growing formations of bryozoans are presented here. The locations are presented together with a map and some information on each location.

Table 2 illustrates the species present in every location, divided into three different types of habitats: rocky bottom, artificial, and maerl bed habitat. When a species is present, it is marked with an X in the table. Species diversity is assessed by counting specimens identified to species, as well as specimens identified to genera or family, using the term "taxa*."* Identification based on morphological traits can be challenging for some genera. Such as *Aetea* and *Tubulipora*. Without the use of, e.g., SEM scanning, identification of these two genera are regarded as impossible. Therefore, taxa are used instead of species when assessing diversity.

Table 2: Species occurrences in sample locations along the coast. Separated into samples gathered in this study, and samples from the PolyPort material, divided into the different habitat types; rocky bottom, artificial and maerl bed. X translates to species being present. Records with number illustrate appurtenant figure number. Species name in bold indicated species sampled for DNA barcoding.

		Sampled in this study						PolyPort									
	Location -->	Ørland			Kristiansund	Bergen		Bergen	Stavanger	Kristiansand	Lillesand	Grimstad	Risør	Tvedestrand	Porsgrunn	Sandefjord	Oslo
	Habitat -->	Rocky bottom	Maerl	Artificial	Artificial	Maerl	Artificial	Artificial									
Cheilostomatida	Scientific name																
	***Aetea* sp. Lamouroux, 1812**						X[15]		X	X		X	X				
	***Scruparia ambigua* (d'Orbigny, 1841)**		X[19]					X				X					
	Scruparia sp. Oken, 1815	X[16]						X	X			X					
	***Membranipora membranacea* (Linnaeus, 1767)**	X[16]	X[18]	X			X[25]	X	X		X	X	X		X		
	Conopeum reticulum (Linnaeus, 1767)															X	
	Conopeum cf. *reticulum* (Linnaeus, 1767)																X
	Conopeum sp. Gray, 1848														X	X	
	Einhornia crustulenta (Pallas, 1766)									X							
	***Electra pilosa* (Linnaeus, 1767)**	X[16]	X[18]	X	X	X	X[25]	X	X	X	X	X	X	X	X		
	***Callopora* cf. *craticula* (Alder, 1856)**		X														
	***Callopora lineata* (Linnaeus, 1767)**		X														
	Callopora dumerilii (Audouin, 1826)					X											
	***Callopora* sp. Gray, 1848**	X	X[18]														
	***Amphiblestrum flemingii* (Busk, 1854)**		X[18]														
	Crisularia plumosa (Pallas, 1766)								X								
	Crisularia cf. *plumosa* (Pallas, 1766)								X								
	Bugulina cf. *simplex* (Hincks, 1886)								X								
	Bugula sp. Oken, 1815								X								
	Candidae indet. d'Orbigny, 1851							X	X	X		X	X				
	***Cradoscrupocellaria reptans* (Linnaeus, 1758)**						X										
	Cradoscrupocellaria cf. reptans (Linnaeus, 1758)				X		X	X	X								
	Scrupocellaria sp. van Beneden, 1845								X								
	Tricellaria sp. Fleming, 1828						X										

	Sampled in this study						PolyPort									
Location -->	Ørland			Kristiansund	Bergen		Bergen	Stavanger	Kristiansand	Lillesand	Grimstad	Risør	Tvedestrand	Porsgrunn	Sandefjord	Oslo
Habitat -->	Rocky bottom	Maerl	Artificial	Artificial	Maerl	Artificial	Artificial									
***Juxtacribrilina annulata* (Fabricius, 1780)**		X[18]			X											
Juxtacribrilina cf. *mutabilis* (Ito, Onishi & Dick, 2015)			X[16]					X								
***Juxtacribrilina mutabilis* (Ito, Onishi & Dick, 2015)**				X[22]		X[25]	X	X	X			X		X		
Cribrilina sp. Gray, 1848		X														
Celleporina tubulosa (Hincks, 1880)					X											
***Celleporella hyalina* (Linnaeus, 1767)**	X[16]	X[18]			X											
***Cryptosula pallasiana* (Moll, 1803)**	X[16]		X[16]	X[22]		X[25]	X	X	X	X	X	X	X	X	X	
***Hippoporina* sp. Neviani, 1895**						X[26]		X								
Escharella immersa (Fleming, 1828)					X											
Porella concinna (Busk, 1854)					X											
***Schizoporella japonica* Ortmann, 1890**				X[22]		X[26]		X								
Schizoporella cf. *japonica* Ortmann, 1890								X	X			X				
Schizoporella cf. *Unicornis* (Johnston in Wood, 1844)												X				
***Schizoporella* sp. Hincks, 1877**	X[16]							X		X		X				
***Parasmittina trispinosa* (Johnston, 1838)**					X[26]											
***Schizomavella (Schizomavella) linearis* (Hassall, 1841)**					X											
***Microporella ciliata* (Pallas, 1766)**	X[17]	X[19]			X											
Microporella sp. Hincks, 1877					X											
Fenestrulina cf. *delicia* Winston, Hayward & Craig, 2000				X[22]												
***Fenestrulina malusii* (Audouin, 1826)**		X[18]			X	X										
***Cellepora pumicosa* (Pallas, 1766)**					X[26]											
Celleporina calciformis (Lamouroux, 1816)		X														
***Turbicellepora avicularis* (Hincks, 1860)**					X[26]											
Reteporella sp. Busk, 1884								X								
Cheilostomatida indet. Busk, 1852							X	X								

		Sampled in this study						PolyPort									
	Location -->	Ørland			Kristiansund	Bergen		Bergen	Stavanger	Kristiansand	Lillesand	Grimstad	Risør	Tvedestrand	Porsgrunn	Sandefjord	Oslo
	Habitat -->	Rocky bottom	Maerl	Artificial	Artificial	Maerl	Artificial	Artificial									
Cyclostomatida	***Crisia* sp. Lamouroux, 1812**	X				X[26]			X								
	Crisidia cornuta (Linnaeus, 1758)								X								
	***Crisiella producta* (Smitt, 1865)**	X[17]	X[19]														
	Crisiidae indet. Johnston, 1838							X	X	X					X		
	***Tubulipora* sp. Lamarck, 1816**	X[17]	X[19]		X	X[26]	X		X								
	Plagioecia patina (Lamarck, 1816)		X												X		
	***Diplosolen obelium* (Johnston, 1838)**		X														
	***Patinella verrucaria* (Linnaeus, 1758)**		X[19]														
	Patinella sp. Gray, 1848					X											
	Disporella hispida (Fleming, 1828)	X[17]	X[19]														
	Lichenoporidae indet. Smitt, 1867		X														
	Cyclostomatida indet. Busk, 1852					X											
Ctenostomatida	***Alcyonidium gelatinosum* (Linnaeus, 1761)**	X[17]								X							
	***Alcyonidium hirsutum* (Fleming, 1828)**	X[17]															
	***Flustrellidra hispida* (Fabricius, 1780)**	X[17]															
	Amathia sp. Lamouroux, 1812								X			X					
	Stoloniferina indet. Thomson & Simpson, 1909									X							
	Ctenostomatida indet. Busk, 1852								X	X		X		X			

3.1 Ørland

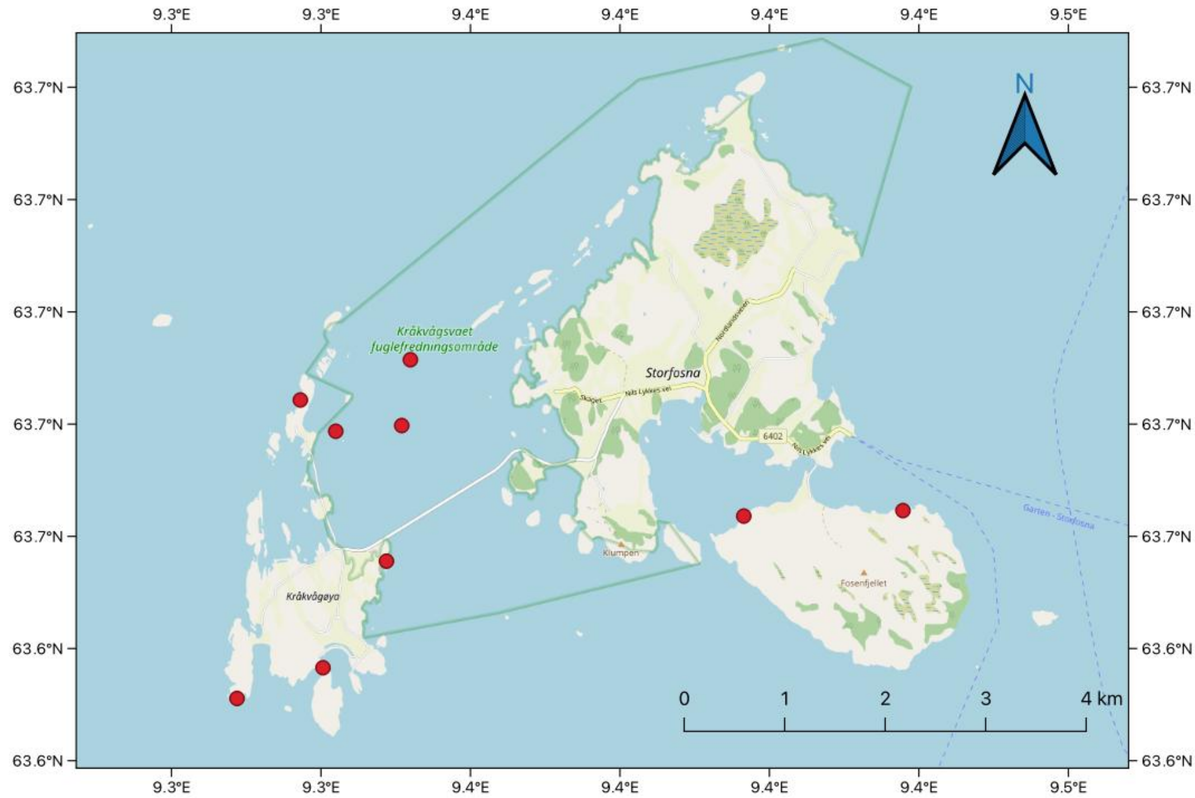


Figure 13: Map with sampling locations in the Ørland area. Map sourced from QGIS.

Records of species

In the artificial habitat, four different species were recorded; only of the cheilostome order, the common species *Electra pilosa, Membranipora membranacea*, and *Cryptosula pallasiana* were present, together with the alien species *Juxtacribrilina mutabilis* (Fig. 16). In the rocky bottom habitats, 15 taxa were recorded. *Electra pilosa, M. membranacea* and *C. pallasiana* were some of the species recorded. Three different ctenostome species were recorded (Fig. 16, 17). Approximately 18 different taxa were recorded from the maerl bed habitat, *E. pilosa, M. membranacea* present, with no records of ctenostome species (Fig. 18, 19). No records of alien species in the rocky bottom and maerl bed habitats. See Table 2 for all species recorded from Ørland.

Description of habitats

The sampling in the Ørland area was done in three different habitats; rocky bottom, artificial, and maerl bed habitat. The rocky-bottom habitat consisted of rocky substrate and smooth rock slopes in the littoral- and sublittoral zone (Fig. 14A), where the bryozoans lived attached to kelp, rocks, gastropods, and bivalves. Artificial habitat, here a marina (Fig. 14B), with kelp growth on the pontoons, sublittoral habitat. The maerl bed habitat had a substrate consisting of maerl fragments of different sizes (Fig. 14C). This habitat is also sublittoral. Sampling locations are illustrated in Figure 13.

Figure 14: The three different habitat types illustrated. (A) Rocky bottom littoral zone, (B) artificial habitat, (C) maerl bed substrate. Photo A, B: Tine Mathilde Benjaminsen, photo C: Ina R. Bjørseth

The maerl bottom samples had fragments of different sizes. Figure 15 illustrates the diversity of bryozoan species on one small fragment, with three species present. Species were also growing on different algae and polychaete tubes. One observation was that a big part of the bryozoan colonies was small and therefore difficult to identify in some cases.

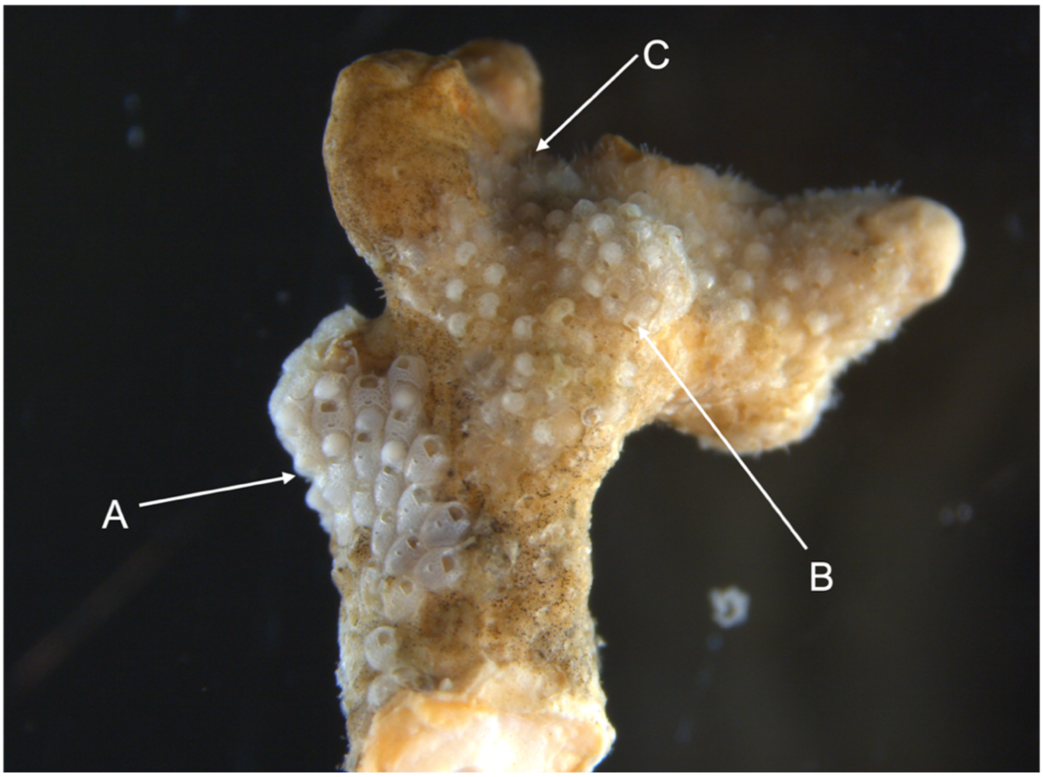


Figure 15: Fragment of maerl, with three species present (NTNU-VM 83765). (A) *Fenestrulina malusii*, (B) *Celleporella hyalina*, (C) *Microporella ciliata*. Photo: Tine Mathilde Benjaminsen.

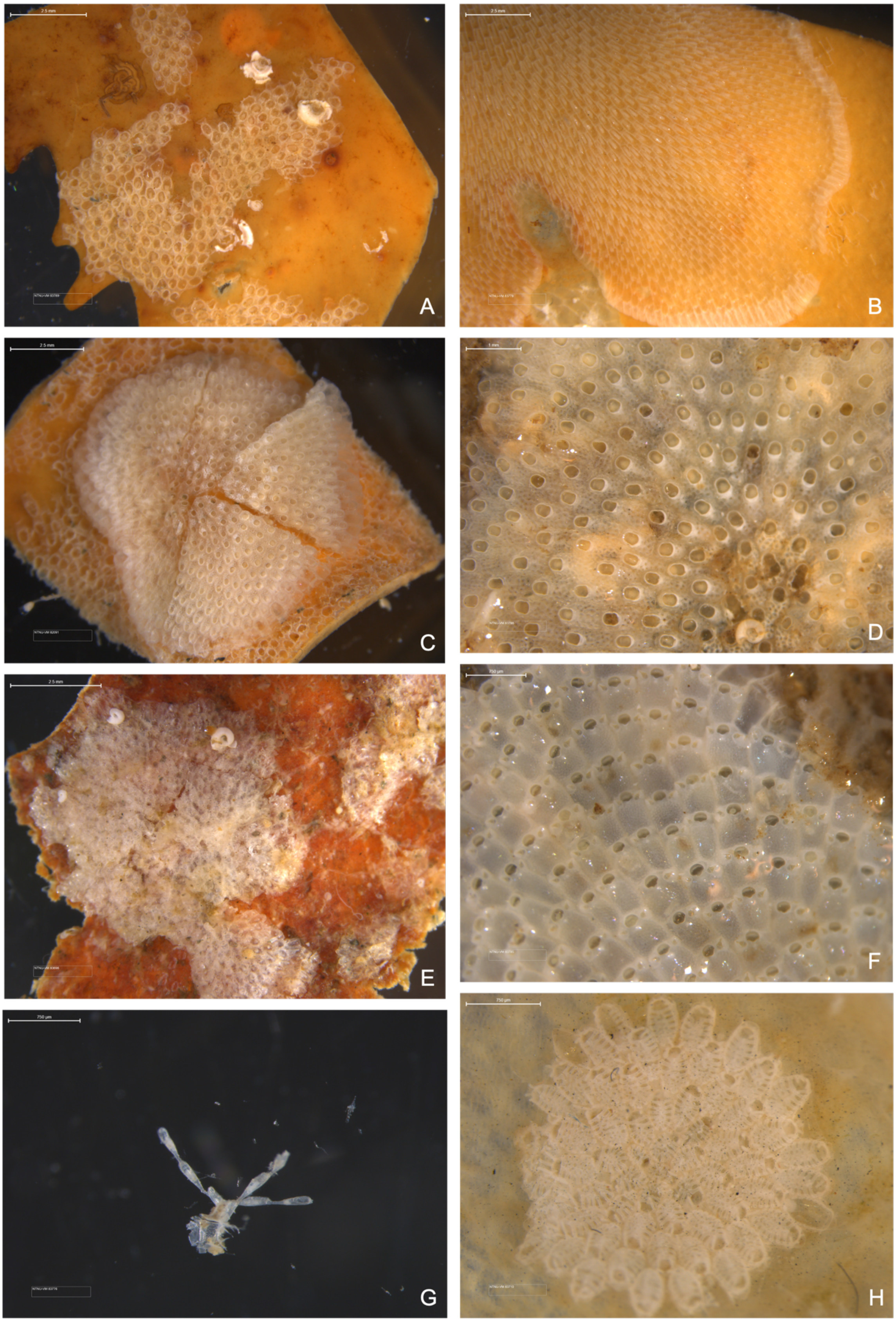


Figure 16: Specimens collected in artificial and rocky bottom habitats. (A) *Electra pilosa* (NTNU-VM 83789), (B) *Membranipora membranacea* (NTNU-VM 83779), (C) *Cryptosula pallasiana* (NTNU-VM 82091), (D) *Cryptosula pallasiana* (NTNU-VM 83786), (E) *Celleporella hyalina* (NTNU-VM 83696), (F) *Schizoporella* sp. (NTNU-VM 83785), (G) *Scruparia* sp. (NTNU-VM 83776), (H) *Juxtacribrilina mutabilis* (NTNU-VM 83710). Photo: Tine Mathilde Benjaminsen.

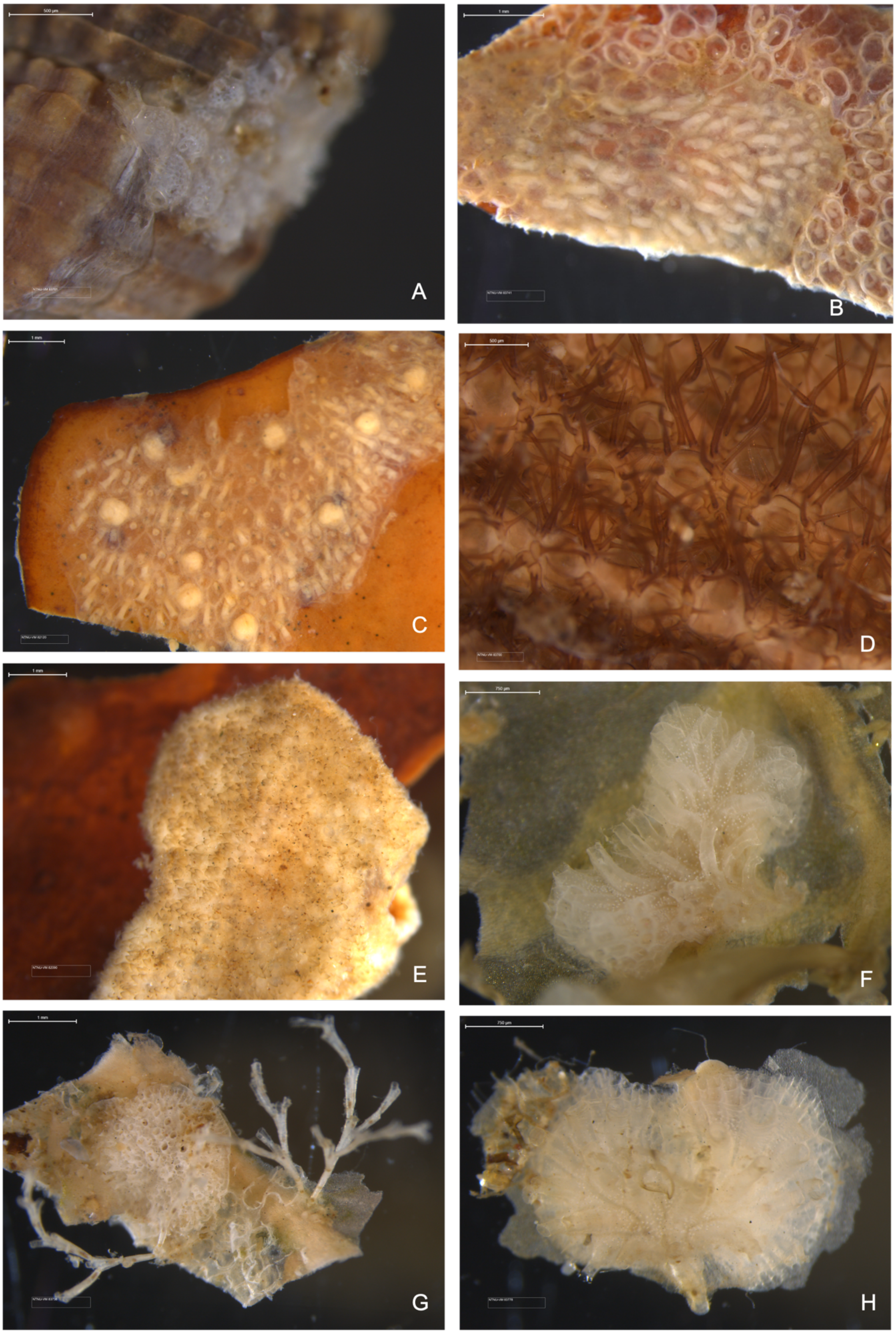


Figure 17: Specimens collected in artificial and rocky bottom habitats. (A) *Microporella ciliata* (NTNU-VM 83701), (B) *Alcyonidium gelatinosum* and *Electra pilosa* (NTNU-VM 83741), (C) *Alcyonidium gelatinosum* (NTNU-VM 82120), (D) *Flustrellidra hispida* (NTNU-VM 83700), (E) *Alcyonidium hirsutum* (NTNU-VM 82090), (F) *Alcyonidium hirsutum* (NTNU-VM 83774), (G) *Disporella hispida*, *Crisiella producta* and *Electra pilosa* (NTNU-VM 83738), (H) *Tubulipora* sp. (NTNU-VM 83778). Photo: Tine Mathilde Benjaminsen.

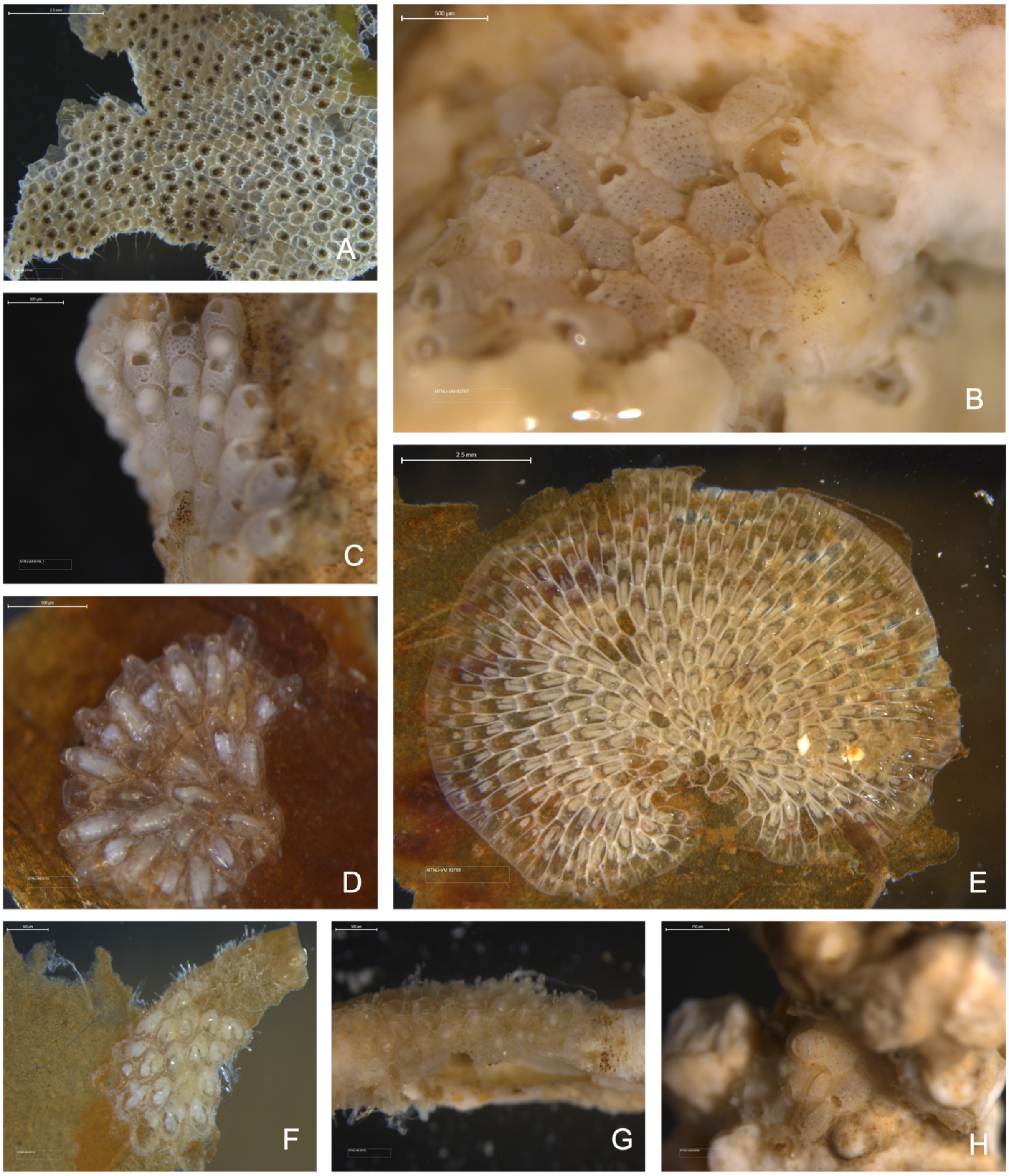


Figure 18: Specimens collected from maerl bed habitat (A) *Electra pilosa* (NTNU-VM 83769), (B) *Juxtacribrilina annulata* (NTNU-VM 83787), (C) *Fenestrulina malusii* (NTNU-VM 83765), (D) *Celleporella hyalina* (NTNU-VM 83761), (E) *Membranipora membranacea* (NTNU-VM 83768), (F) *Callopora* sp. (NTNU-VM 83734), (G) *Amphiblestrum flemingii* (NTNU-VM 83730), (H) *Juxtacribrilina annulata* (NTNU-VM 83688). Photo: Tine Mathilde Benjaminsen.

Figure 19: Specimens collected from maerl bed substrate. (A) *Microporella ciliata* (NTNU-VM 83707), (B) *Celleporina* sp. (NTNU-VM 83760), (C) *Scruparia ambigua* (NTNU-VM 83763), (D) *Crisiella producta* (NTNU-VM 83676), (E) *Patinella verrucaria* (NTNU-VM 83771), (F) *Tubulipora* sp. (NTNU-VM 83775), (G) *Patinella verrucaria* (NTNU-VM 83770), (H) *Disporella* cf. *hispida* (NTNU-VM 83671). Photo: Tine Mathilde Benjaminsen.

3.2 Kristiansund

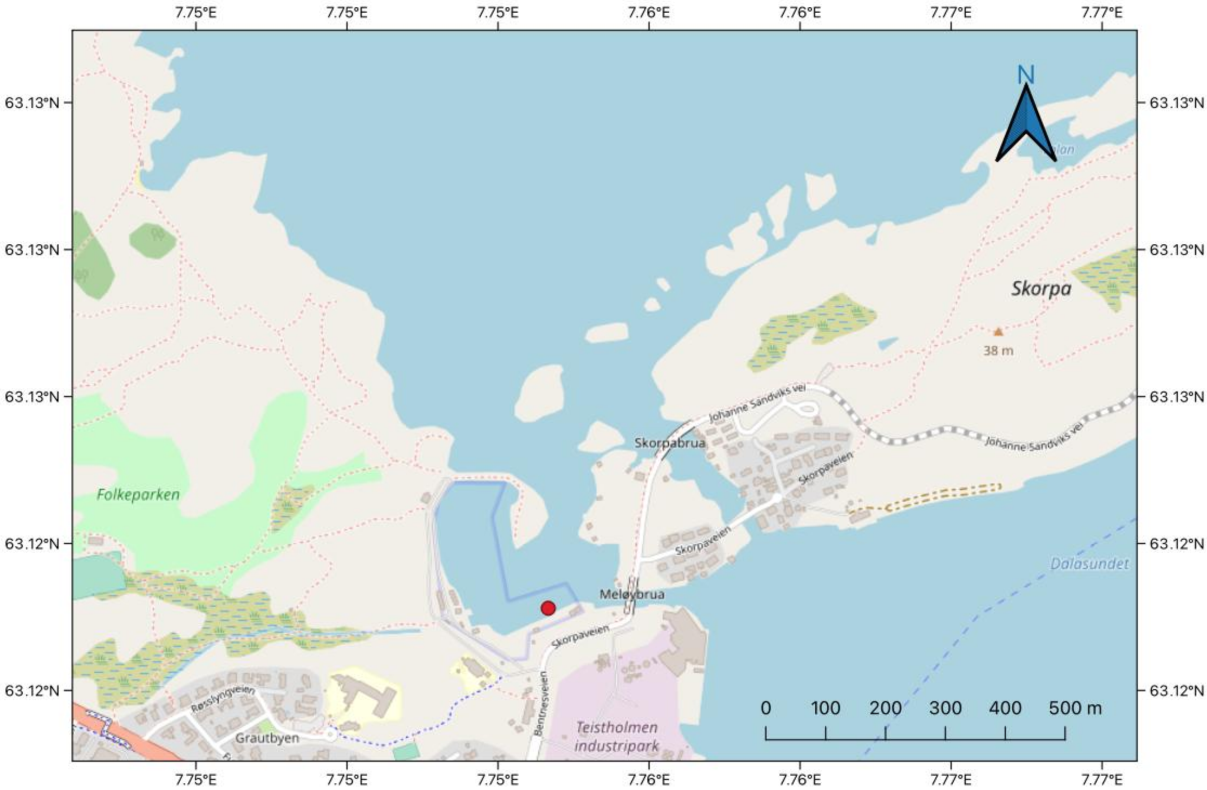


Figure 20: Map of the sample location in Kristiansund. Map sourced from QGIS.

Records of species

In Kristiansund, seven different taxa were recorded; the common species *E. pilosa* and *C. pallasiana* were present together with the possible alien species: *J. mutabilis, S. japonica* and *F. delicia*. Here the cyclostome *Tubulipora* sp. was also present. An overview of all species present in the Kristiansund samples is found in Table 2. Photos of most of the species are depicted in Figure 22.

Description of habitat

Artificial habitat in form of a marina for recreational boats (Fig. 21A). Situated in Kristiansund with open oceans in proximity, an exposed area, partly protected by a breakwater. This area largely depends on fisheries, aquaculture, and off-shore activities and experiences high ship- and boat traffic (Stokkan et al., 2022). Sampling of fouling material on rope and pontoons. Substantial amounts of kelp, ascidians, and *Mytilus* sp. are growing on both ropes and pontoons, with bryozoans growing on all these and directly on the rope and pontoons (Fig. 21B).

Figure 21: Observations from field. (A) Habitat, (B) depiction of typical observed fouling on ropes in the station. Photo: Tine Mathilde Benjaminsen

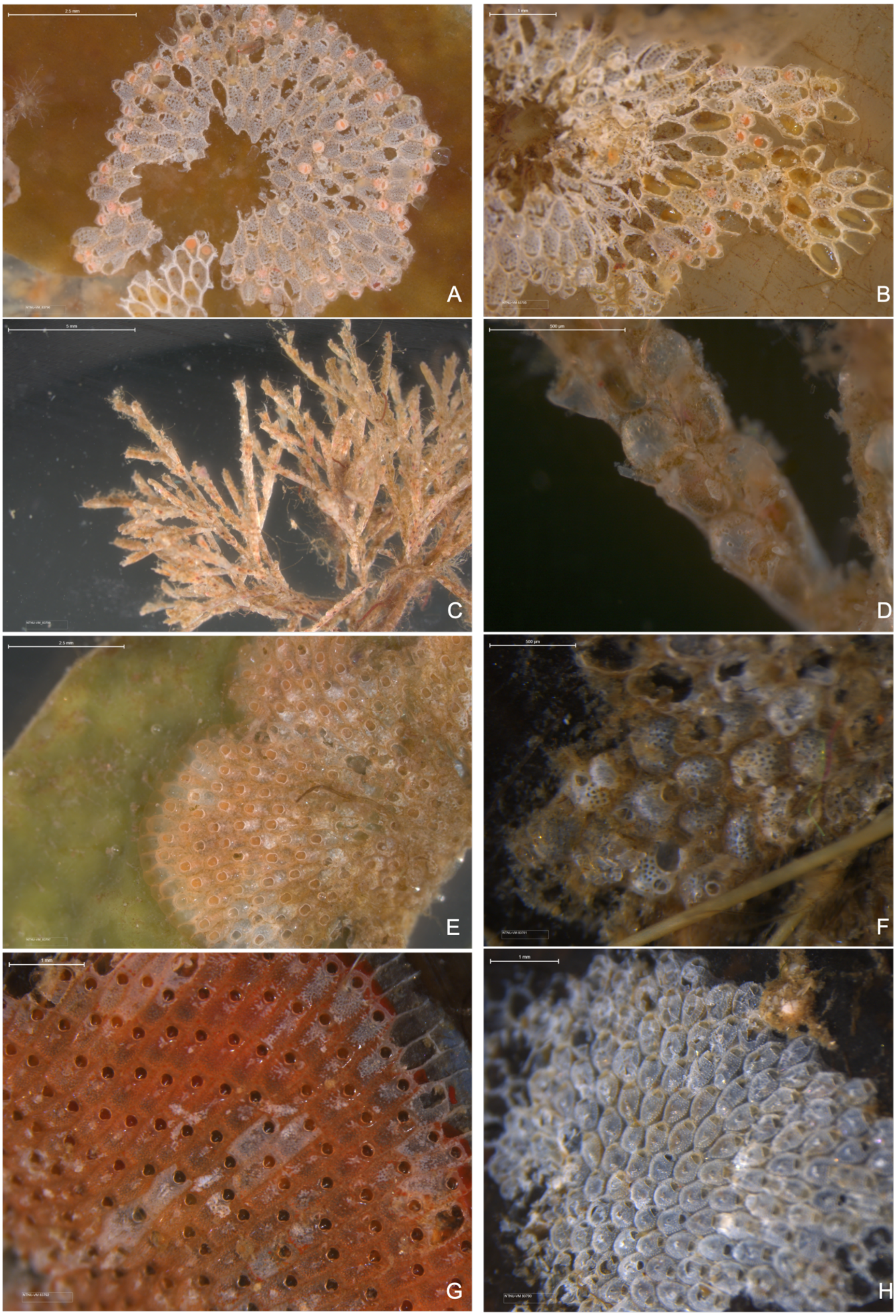


Figure 22: Species collected in Kristiansund. (A) *Juxtracribrilina mutabilis* (NTNU-VM 83796), (B) *Juxtacribrilina mutabilis* (NTNU-VM 83795), (C) Candidae indet. (NTNU-VM 83799), (D) Candidae indet., zooid (NTNU-VM_83799), (E) *Cryptosula pallasiana* (NTNU-VM 83797), (F) Cheilostomatida indet. (NTNU-VM 83791), (G) *Schizoporella japonica* (NTNU-VM 83792), (H) *Fenestrulina* cf. *delicia* (NTNU-VM 83790). Photo: Tine Mathilde Benjaminsen.

3.3 Bergen

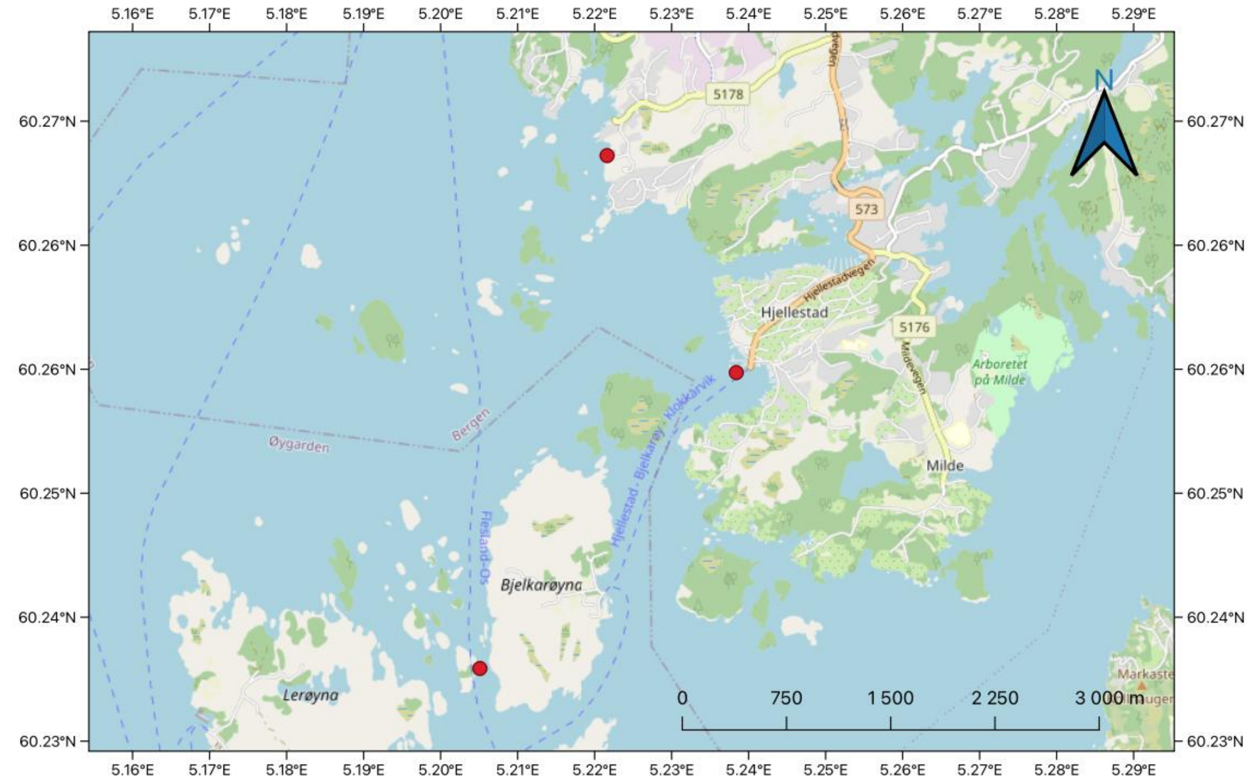


Figure 23: Map of sampling locations in the Bergen area. Map sourced from QGIS.

Records of species

In total, ten taxa were recorded in the material sampled in Bergen. The common species are also present here, together with the alien species; *J. mutabilis* (Fig. 25) and *S. japonica* (Fig. 26). An overview of the species present in the samples from Bergen is found in Table 2. Photos of some recorded species are depicted in Figures 25 and 26.

Description of habitat

The sampling in the Bergen area was conducted around the Espegrend field station, in mainly two different habitat types. Firstly, sublittoral artificial habitats, here being marinas and piers. Rope and pontoons in these locations were inspected for bryozoans. Figure 24 illustrates a typical rope observed on the pier, with heavy fouling by bryozoans. The other type of habitat was an area with maerl bed; this was samples from 14–23-meter depth (sublittoral) where samples were collected with a triangular dredge and consisted of bryozoans growing on maerl of different sizes, shells, and kelp.

Figure 24: Picture of typical fouling on rope from pier, *Schizoporella japonica* (red), growing on top of *Cryptosula pallasiana*. Bryozoan species of the Candidae family is also present, this is the "bush-like" colonies. Photo: Tine Mathilde Benjaminsen.

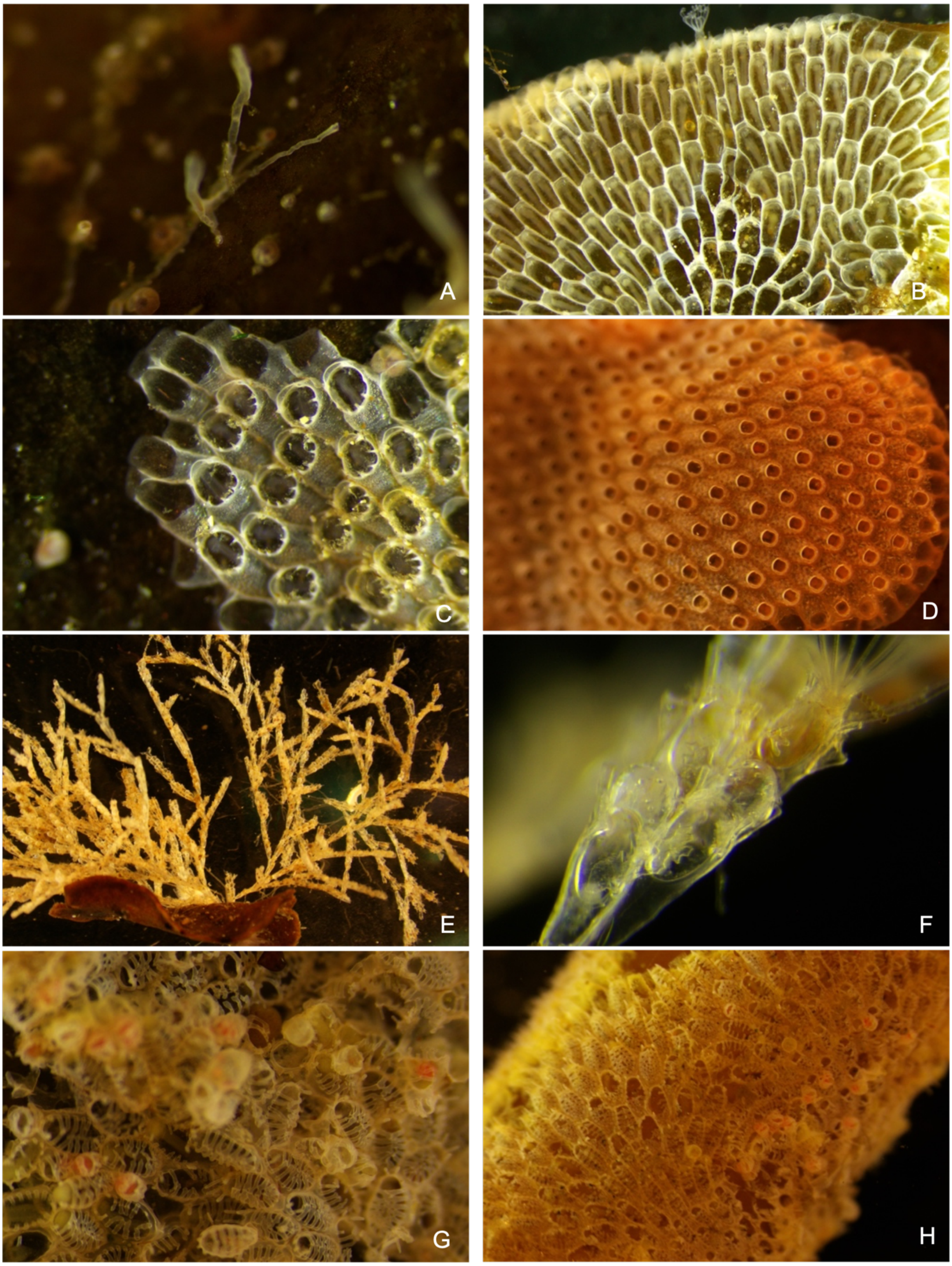


Figure 25: Specimens sampled in Bergen, from artificial habitats. (A) *Aetea* sp. (ZMBN 140129), (B) *Membranipora membranacea* (ZMBN 140136), (C) *Electra pilosa* (ZMBN 140137), (D) *Cryptosula pallasiana* (ZMBN 140133), (E,F) *Tricellaria* sp (ZMBN 140130), (G, H) *Juxtacribrilina mutabilis* (ZMBN 14013, ZMBN 140132). Photo: Tine Mathilde Benjaminsen.

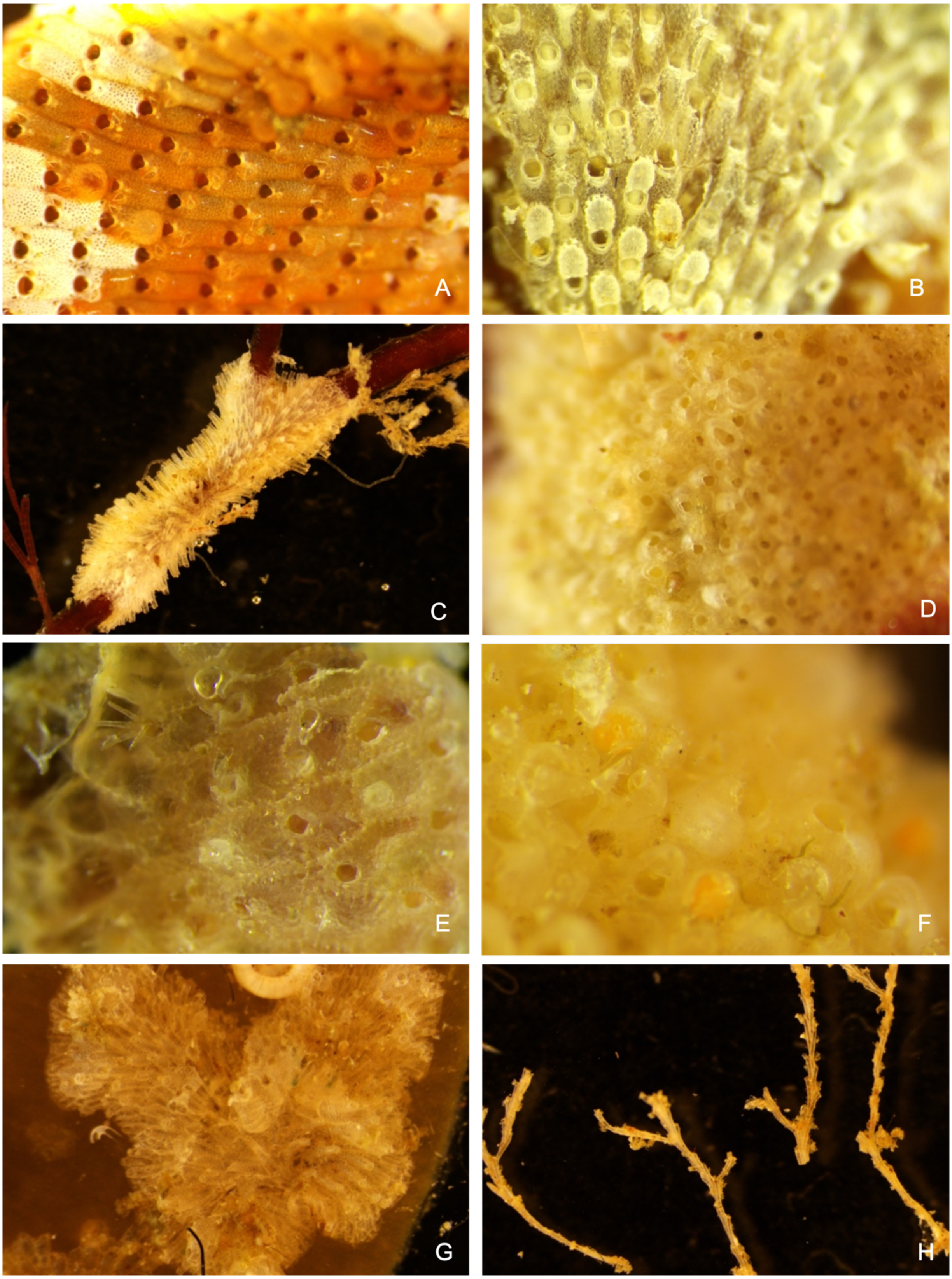


Figure 26: Specimens sampled in Bergen, from artificial habitats (A-C), maerl bed habitat (D-H). (A) *Schizoporella japonica* (ZMBN 140134), *Hippoporina* sp. (ZMBN 140146), (C) *Tubulipora* sp. (ZMBN 140139), (D) *Cellepora pumicosa* (ZMBN 140138), (E) *Parasmittina trispinosa* (ZMBN 140144), (F) *Turbicellepora avicularis* (ZMBN 14014), (G) *Tubulipora* sp. (ZMBN 14014), (H) *Crisia* sp. (ZMBN 140140). Photo: Tine Mathilde Benjaminsen.

3.4 PolyPort Samples, Southern Norway

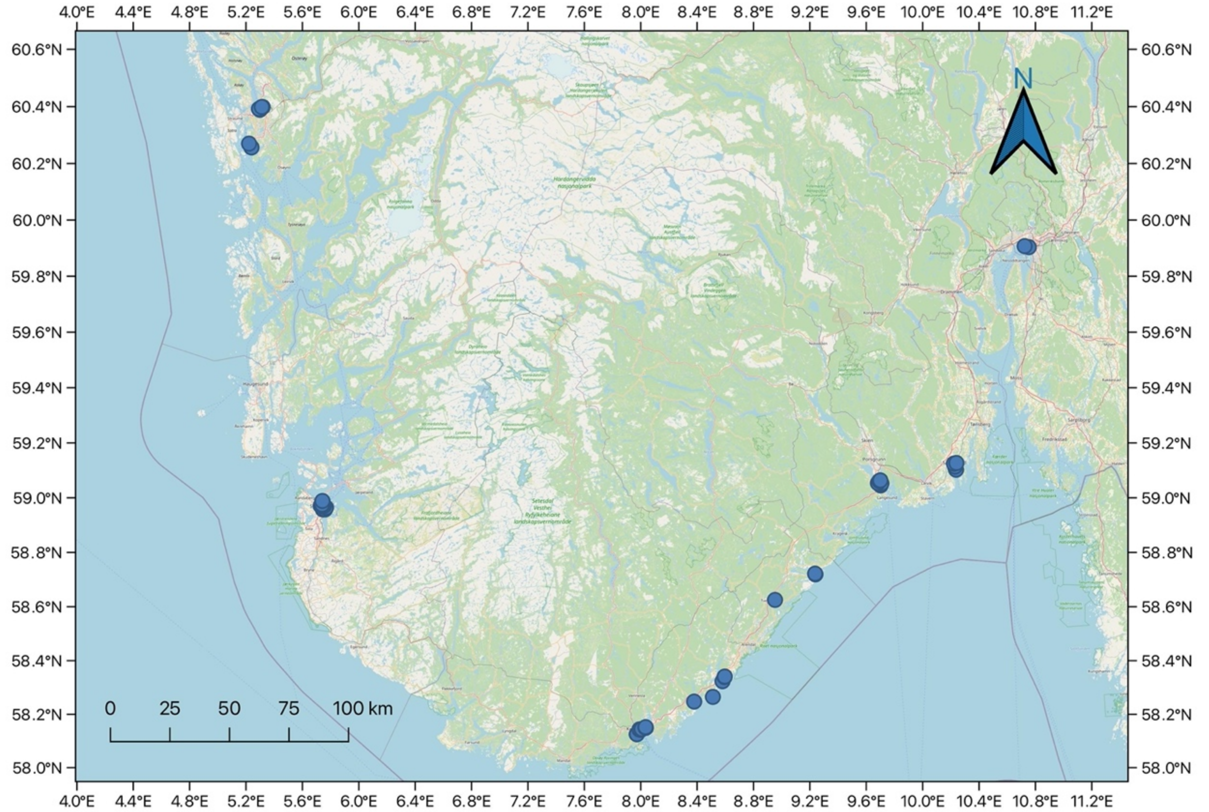


Figure 27: Map of sampling from the PolyPort project used in this master's project. Sampling along the coastline in the southern part of Norway. Map sourced from QGIS.

Records of species

Table 2 illustrates the findings of bryozoans in these locations. With great variations in species diversity and number from one location to another. In these samples, species not recorded in the artificial habitats of Ørland, Kristiansund and Bergen were recorded, such as *Bugulina simplex, Crisularia plumosa, Conopeum* spp., *Einhornia crustulenta, Reteporella* sp., *Crisidia cornuta,* and *Amathia* spp. There were also some records of the family Stolonifera; these samples were often identified to Stolonifera indet. There were no records of this family in the samples north of Stavanger.

Description of habitat

The sampling in the PolyPort project was conducted in ports and marinas along the Norwegian coastline, in both sublittoral and littoral habitats. Some substrates were permanently submerged in water, and others periodically not because of tidewater. These habitats are highly influenced by human activity; the habitats are modified and made of man-made artificial materials. There is runoff from land carrying organic materials and pollution. There are substantial amounts of boat- and ship traffic in these habitats. The focus was polychaetes, but there was also an effort to collect other animal groups. Since others conducted this sampling, one does not possess detailed descriptions of the habitats or observations on how and where the bryozoans grew.

3.5 Occurrence and distribution of alien species

When identifying samples, species not native to Norwegian waters were recorded. Table 3 illustrates the alien species and the location they were found. Some are species described in the Alien species list, and some were described as possible doorknockers by Porter et al. (2015).

Juxtacribrilina mutabilis and *Schizoporella japonica* were frequently observed in the samples along the coast in many of the sample locations. *Schizoporella japonica* is recognized as a high-risk alien species by the NBIC in the Alien species list. It was recognized as a possible doorknocker at Svalbard (NBIC, 2018). *Juxtacribrilina mutabilis*, on the other hand, is not mentioned in the Alien species list.

Table 3: Observations of alien species in from this study and PolyPort samples. X put in parentheses, illustrates specimens identified to cf. species.

	Location	*Schizoporella japonica*	*Tricellaria inopinata*	*Juxtacribrilina mutabilis*	*Bugulina simplex*	*Fenestrulina delicia*
Sampled in this study	Ørland			X		
	Kristiansund	X		X		(X)
	Bergen	X	(X)	X		
PolyPort	Bergen			X		
	Stavanger	(X)		X	(X)	
	Kristiansand	(X)		X		
	Lillesand					
	Grimstad					
	Risør	(X)		X		
	Tvedestrand					
	Porsgrunn			X		
	Sandefjord					
	Oslo					

There were frequent observations of the invasive species ***Juxtacribrilina mutabilis*** (Ito, Onishi & Dick, 2015), as seen in Table 3. *Cribrilina* (*Juxtracribrilina*) mutabilis was originally described from Hokkaido, Japan (Ito et al., 2015). This species was first recorded in Norway in 2008 (Dick et al., 2020). Characterized by small and rounded colonies (Fig. 28A,C). Autozooids are oval, with a frontal shield consisting of costae. One to two pairs of distal spines. One pair of short, straight distal oral spines (Fig. 28B), with 0-2 smaller spines in-between (Fig. 28B) (Ito et al., 2015). *Juxtacribrilina mutabilis* brood internally and can have quite distinct ovicells called "dwarf zooids." These are zooids half the size of normal autozooids, bearing an orange embryo (Fig. 28C, D) (Dick et al., 2020). The related species *Juxtacribrilina annulata* can also have these, but embryos of the *J. annulata* are present during the summer months (Hayward & Ryland, 1998). This further affirms that our findings are *J. mutabilis* since embryos were found in specimens collected in February. This species is not yet on the Alien species list, whether as a doorknocker or an alien species.

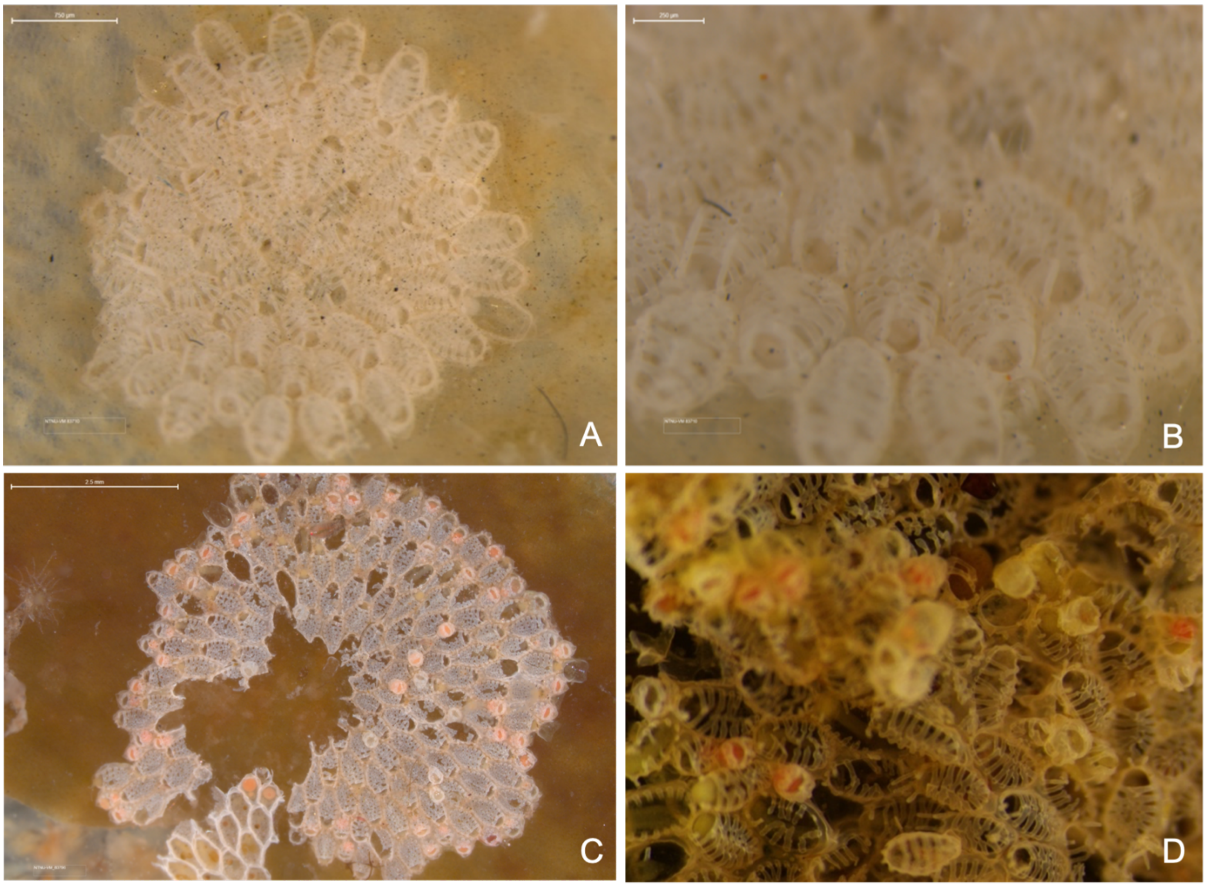


Figure 28: *Juxtacribrilina mutabilis.* (A) Colony (NTNU-VM 83710), (B) closeup of zooids, where one can see the costae and spines (NTNU-VM 83710), (C) (NTNU-VM 83796), (D) ZMBN 14013) colonies with dwarf cells, containing orange embryos. Photo: Tine Mathilde Benjaminsen

Schizoporella japonica is one of the species characterized as a high-risk alien species by the Norwegian Biodiversity Information Centre. From Table 3, one can see some records of this species. Characterized by an evenly perforated frontal shield, adventitious avicularium, and globular, spherical ovicells, like all *Schizoporella* sp. (Hayward & Ryland, 1999). *Schizoporella japonica* has pale whitish pink to vivid red-orange colonies (Fig. 29A). Colonies regularly unilaminar but can have raised edges or slightly elevated lobes (Fig. 29A). Zooids are organized in linear series. Zooids longer than broad (Fig. 29D). Numerous pores in the frontal wall (Fig. 29B). Orifice shallower than wide, shaped with a sinus, sinus shallow and broad (Fig. 29B). Usually 0-1 avicularia, rarely 2 or more. Globular ovicells, with pores radial ridges (Fig. 29B) (Ryland et al., 2014).

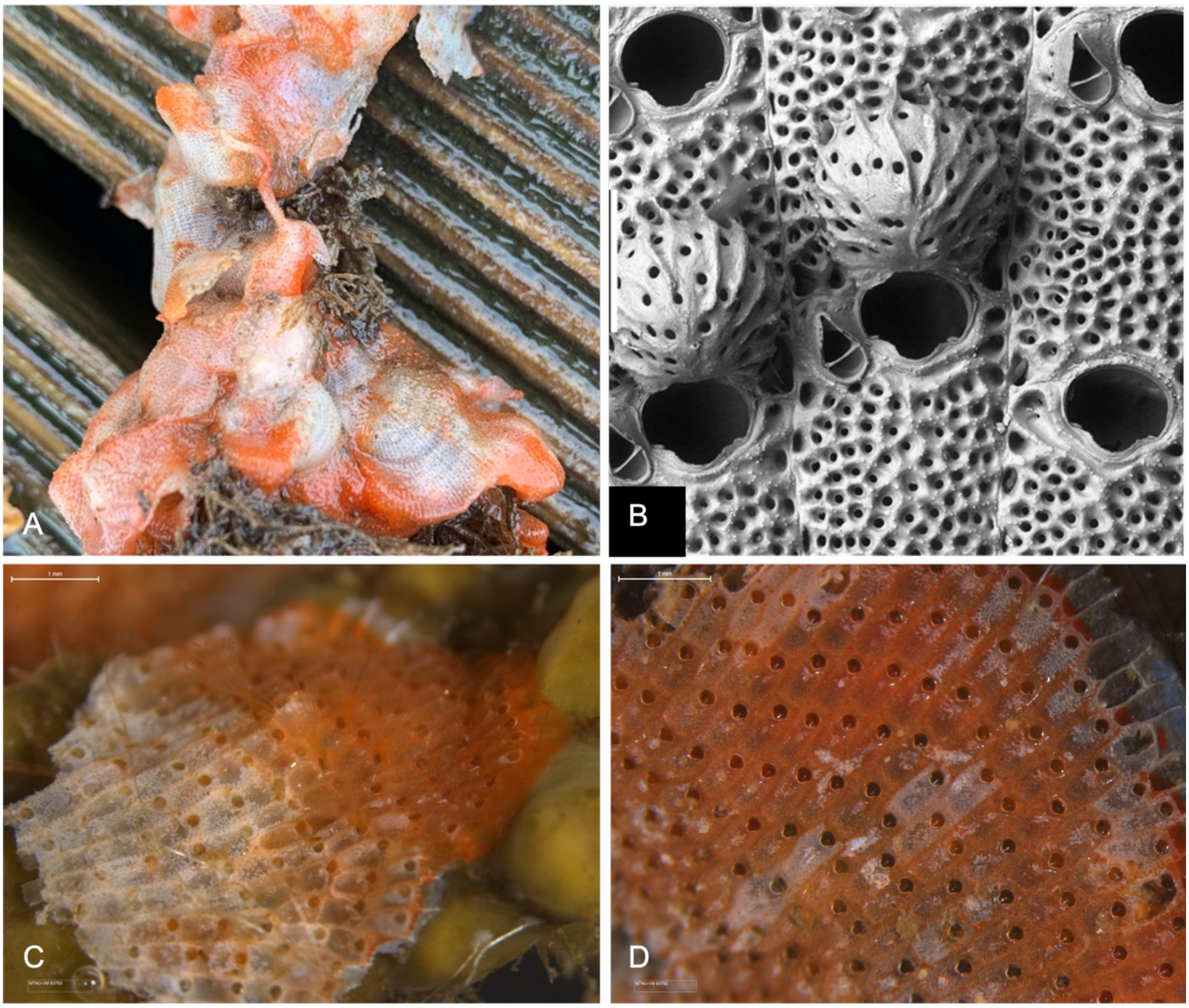


Figure 29: *Schizoporella japonica*. (A) Colony growing on rope, showing both the whiteish pink and red-orange colour, (B) SEM photo of zooids, (C) colony with both dead and living zooids, lophophore visible in some zooids (NTNU-VM 83793), (D) colony growing on *Mytilus* sp. (NTNU-VM 83792). Photo A, C and D: Tine Mathilde Benjaminsen, Photo B: SEMs at NHMUK by P. D. Taylor (Ryland et al., 2014)

This species has its origin in the west Pacific Ocean, especially around Japan and China. It was introduced to the eastern Pacific (California) caused by import of pacific oysters for cultivation purposes (Oug et al., 2019). It was first recorded in Norway by Porter et al. (2015) in 2014, likely being overlooked before this. It is believed that *S. japonica* can easily be transferred between ports by transport of ships, by attaching itself to ships, and then spreading in the new areas. *Schizoporella japonica* has a short larval development and, therefore, a low ability to spread on its own in, e.g., ballast water (NBIC, 2018). This alien species is known to outcompete native bryozoan species and other encrusting organisms on rocky bottom substrate. This, together with the high invasion potential, characterizes this alien species as a high risk species in the Alien species list. (Oug et al., 2019).

There were possible recordings of species described as a doorknocker species by Porter et al. (2015), ***Fenestrulina delicia*** Winston, Hayward, and Craig, 2000 and *Bugulina simplex* (Hincks, 1886). The specimen of *F. delicia* were recorded in Kristiansund. First recognized as the species *Fenestrulina malusii* (Audouin, 1826), but by closer inspection characteristic structural differences were observed. *Fenestrulina delicia* is recognized by calcification partly hiding the lateral pores of the zooidal border (Fig. 30B); in *F. malusii,* the lateral pores are free. Another character that separates them is the calcification of the ovicells. The ovicells of *F. delicia* are transversally ridged while smooth in the *F. malusii* (De Blauwe et al., 2014). The colony found did not possess any ovicells, making the calcification around the zooidal border the main reason for identifying this to *Fenestrulina* cf. *delicia*. With proper SEM photography or a colony possessing ovicells, one could more certainly record *F. delicia* in Norwegian waters. *Fenestrulina delicia* was also mentioned as a doorknocker species in the report *Development of methodology for monitoring of alien marine species* from the Norwegian Institute of Water Research (NIVA) (Rinde et al., 2017).

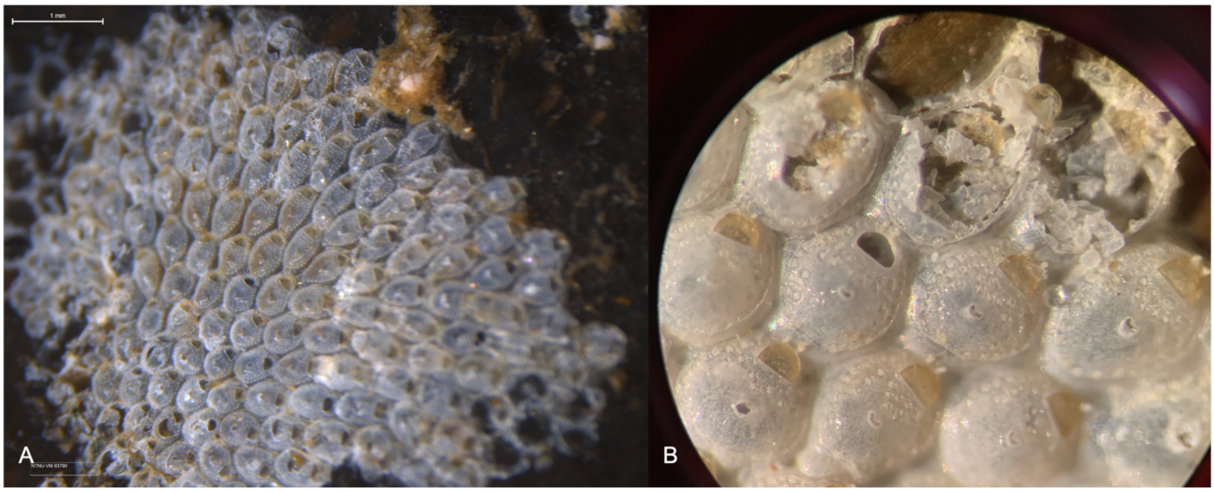


Figure 30: *Fenestrulina cf. delicia* (NTNU-VM 83790). (A) colony, (B) closeup of zooids, where one can see the calcification around the zooidal border partly covering the lateral pores. Photo: Tine Mathilde Benjaminsen.

One specimen from Stavanger was identified as ***Bugulina simplex*** (Hincks, 1886). *Bugulina simplex* is characterized by a funnel-shaped colony with a narrow branch (Fig. 31A). Hemispherical ovicells, helmet shaped (Fig. 31B). Birdshead avicularium, beak downcurved (Fig. 31C) (Hayward & Ryland, 1998). These characters were present in the specimen collected. *Bugulina simplex* is currently not listed as a doorknocker in the Norwegian Alien species list, although Porter et al. (2015) suggested for it to be added because of its current rate of spread and proximity. This species has been collected in Ouddorp in the Netherlands (Ryland et al., 2011), and the most northernmost record of this species was collected in 2014 in Lerwick Harbour, Shetland (Porter et al., 2015). There are no current records of this *B. simplex* in Norway except for this one possible record from Stavanger. However, with regular traffic between the Netherlands and Norwegian ports, it is to be expected in Norwegian waters. It was suggested to be added to the Alien species list (Porter et al., 2015). Some colonies of Bugulidae die during the winter, like many other branching species. Therefore, surveys of these should therefore not happen during the winter months (Ryland et al., 2011).

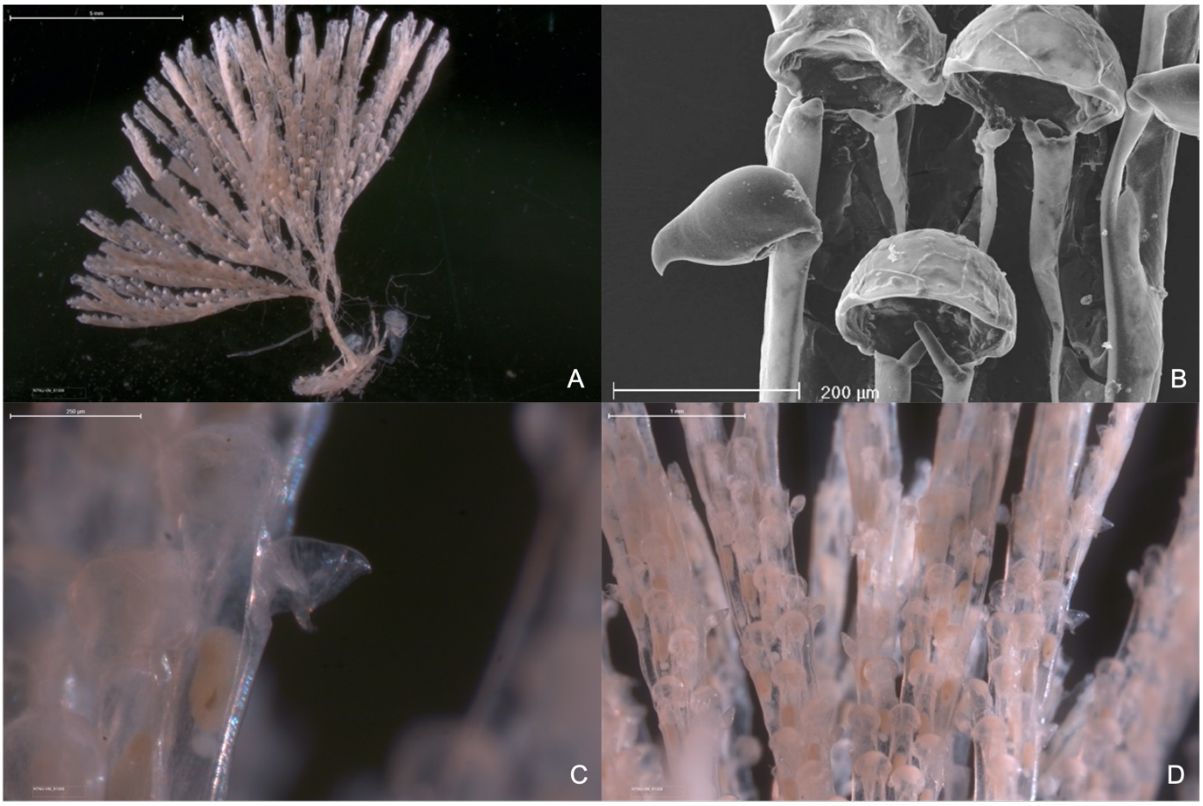


Figure 31: *Bugulina simplex* (A, C, D: NTNU-VM 81309). (A) Colony, (B) SEM of Ovicells and avicularium, (C) "birdshead" avicularium, (D) closeup of zooids. Photo A, C, D: Tine Mathilde Benjaminsen, Photo B: Ryland et al. (2011).

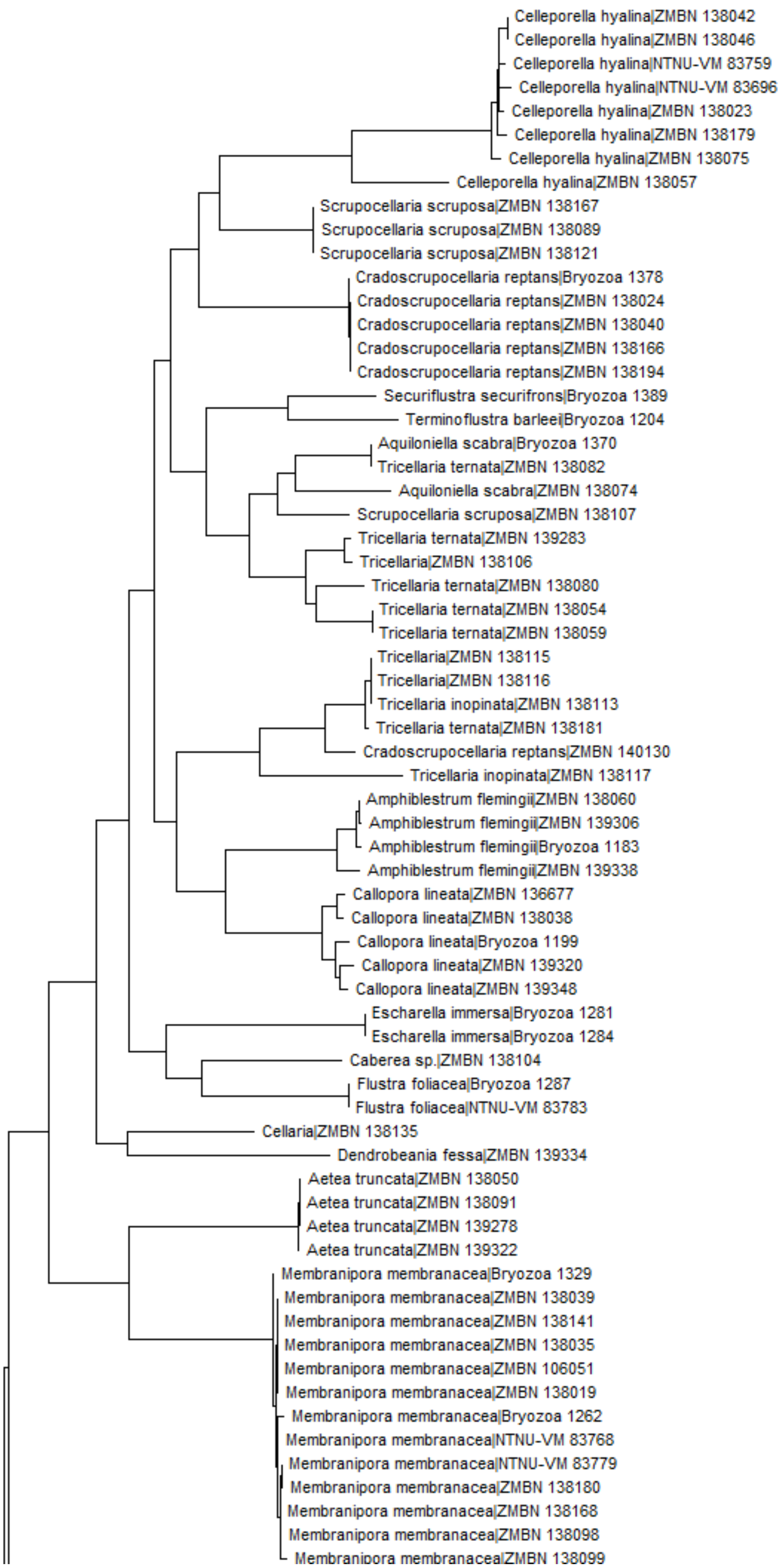
There are no certain records of ***Tricellaria inopinata*** in this study because of lacking knowledge on morphological identification of species from the Candidae family. Porter et al. (2015)

recorded *T. inopinata* in Kristiansund and Florø. Therefore, one can estimate that there is a great chance of *T. inopinata* being present in the records from this study identified to Candidae indet.*Tricellaria inopinata* is, although present in Tables 2 and 3, this because of DNA results showing a possible misidentification of a *Tricellaria* sp. as *Cradoscrupocellaria reptans* (ZMBN 140130). This is further explained in chapter 4.4.

3.5 Results from DNA barcoding

Of the 60 species recorded in this study 31 were sampled for barcoding. There have been produced barcode sequences for approximately 50 bryozoan species, including results from this study and other sampling of bryozoan species in the HABFA project, representing 17% of the confirmed Norwegian bryozoan species diversity. There are about 22 clades, with two or more specimens with a solid association between clade and species. Many of the species represented in the tree have only one sequence; these are not counted as clades. Three species have multiple clades. *Crisia eburnea* (Fig. 33), *Celleporella hyalina,* and *Microporella ciliata* (Fig. 32)*,* all placed in two clades.

The sequences were analysed together with sequences in GenBank. An NJ-tree of the sampled alien species and the same alien species from other geographical locations were produced (Fig. 34).


Celleporella hyalina|ZMBN 138042
Celleporella hyalina|ZMBN 138046
Celleporella hyalina|NTNU-VM 83759
Celleporella hyalina|NTNU-VM 83696
Celleporella hyalina|ZMBN 138023
Celleporella hyalina|ZMBN 138179
Celleporella hyalina|ZMBN 138075
Celleporella hyalina|ZMBN 138057
Scrupocellaria scruposa|ZMBN 138167
Scrupocellaria scruposa|ZMBN 138089
Scrupocellaria scruposa|ZMBN 138121
Cradoscrupocellaria reptans|Bryozoa 1378
Cradoscrupocellaria reptans|ZMBN 138024
Cradoscrupocellaria reptans|ZMBN 138040
Cradoscrupocellaria reptans|ZMBN 138166
Cradoscrupocellaria reptans|ZMBN 138194
Securiflustra securifrons|Bryozoa 1389
Terminoflustra barleei|Bryozoa 1204
Aquiloniella scabra|Bryozoa 1370
Tricellaria ternata|ZMBN 138082
Aquiloniella scabra|ZMBN 138074
Scrupocellaria scruposa|ZMBN 138107
Tricellaria ternata|ZMBN 139283
Tricellaria|ZMBN 138106
Tricellaria ternata|ZMBN 138080
Tricellaria ternata|ZMBN 138054
Tricellaria ternata|ZMBN 138059
Tricellaria|ZMBN 138115
Tricellaria|ZMBN 138116
Tricellaria inopinata|ZMBN 138113
Tricellaria ternata|ZMBN 138181
Cradoscrupocellaria reptans|ZMBN 140130
Tricellaria inopinata|ZMBN 138117
Amphiblestrum flemingii|ZMBN 138060
Amphiblestrum flemingii|ZMBN 139306
Amphiblestrum flemingii|Bryozoa 1183
Amphiblestrum flemingii|ZMBN 139338
Callopora lineata|ZMBN 136677
Callopora lineata|ZMBN 138038
Callopora lineata|Bryozoa 1199
Callopora lineata|ZMBN 139320
Callopora lineata|ZMBN 139348
Escharella immersa|Bryozoa 1281
Escharella immersa|Bryozoa 1284
Caberea sp.|ZMBN 138104
Flustra foliacea|Bryozoa 1287
Flustra foliacea|NTNU-VM 83783
Cellaria|ZMBN 138135
Dendrobeania fessa|ZMBN 139334
Aetea truncata|ZMBN 138050
Aetea truncata|ZMBN 138091
Aetea truncata|ZMBN 139278
Aetea truncata|ZMBN 139322
Membranipora membranacea|Bryozoa 1329
Membranipora membranacea|ZMBN 138039
Membranipora membranacea|ZMBN 138141
Membranipora membranacea|ZMBN 138035
Membranipora membranacea|ZMBN 106051
Membranipora membranacea|ZMBN 138019
Membranipora membranacea|Bryozoa 1262
Membranipora membranacea|NTNU-VM 83768
Membranipora membranacea|NTNU-VM 83779
Membranipora membranacea|ZMBN 138180
Membranipora membranacea|ZMBN 138168
Membranipora membranacea|ZMBN 138098
Membranipora membranacea|ZMBN 138099

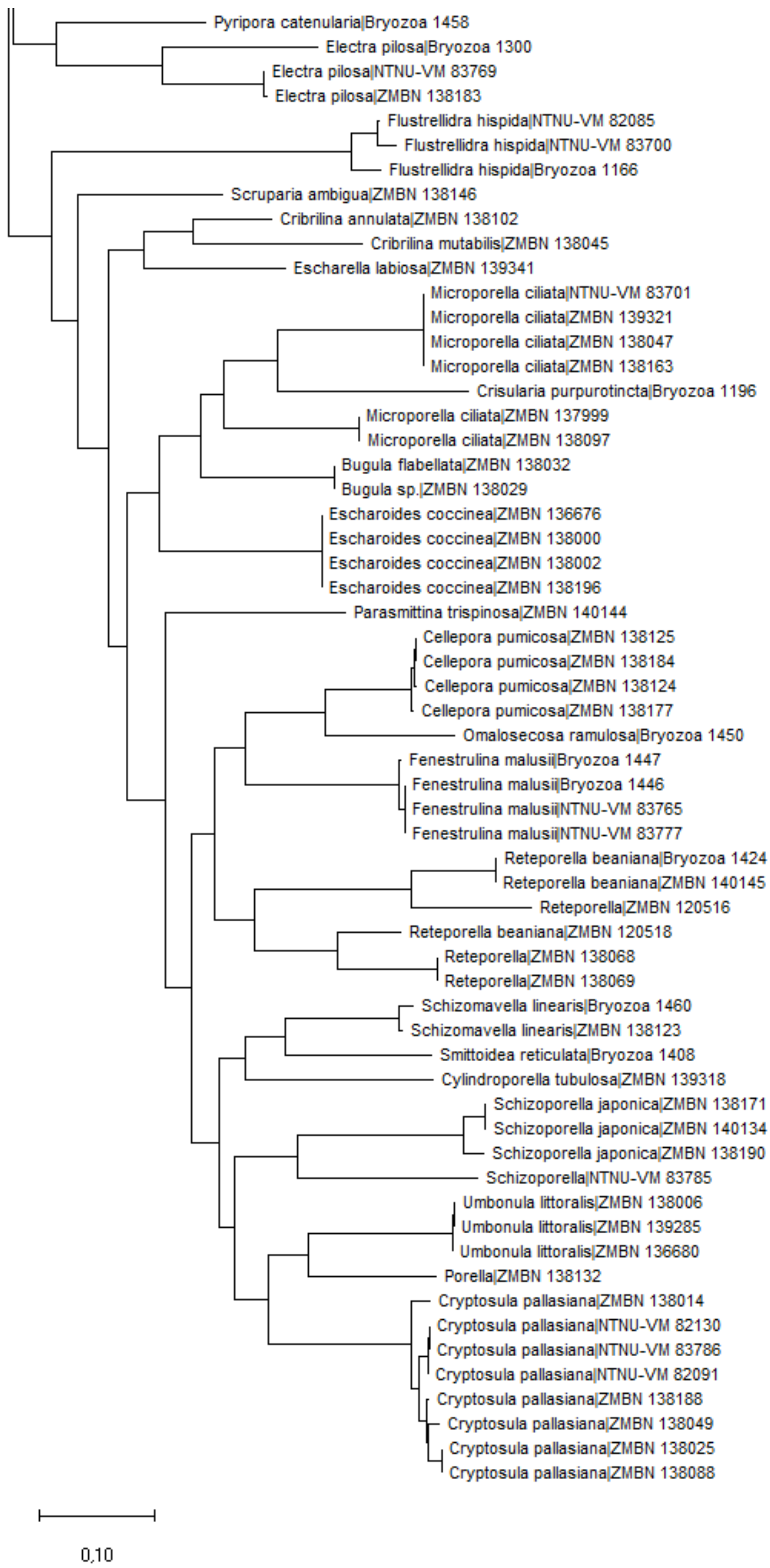


Figure 32: Figure 33: Neighbour joining tree generated in MEGA of the Cheilostome species. Specimens include sample ID.

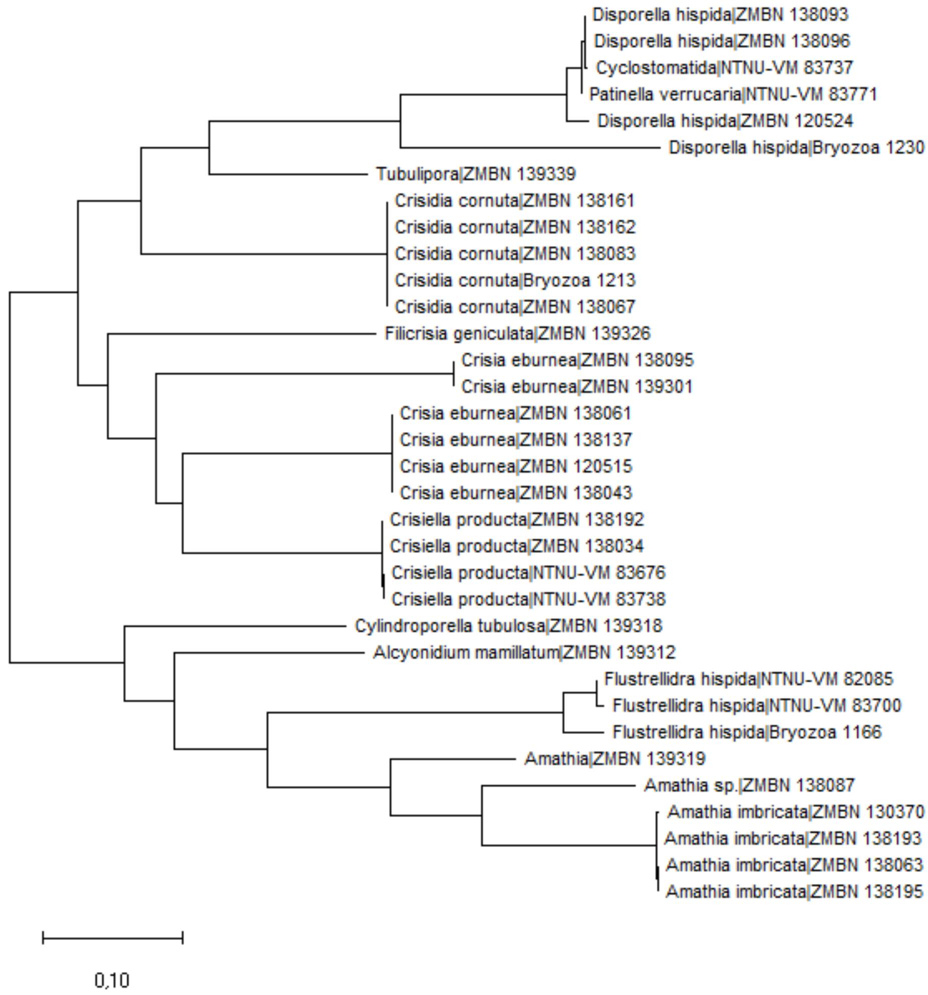


Figure 33: Neighbor joining tree generated in MEGA of the Ctenostome species. Specimens include sample ID.

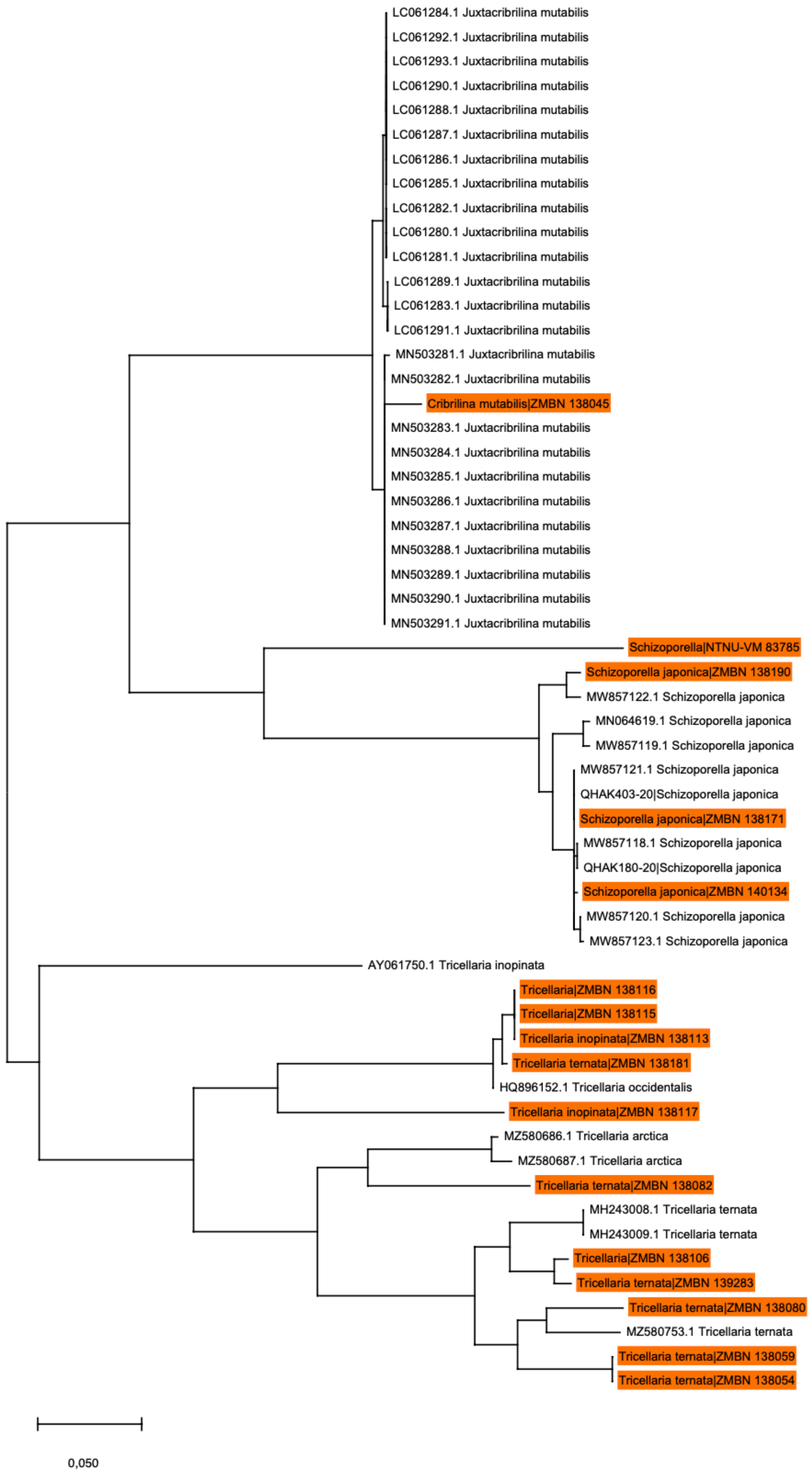


Figure 34: Neighbour joining tree generated in MEGA, using data from GenBank. Specimens include sample ID. Marked specimens are from HABFA project.

4. Discussion

The results of this study show the diversity of the bryozoan species in shallow waters of the Norwegian coast. This study set out to contribute to the mapping of bryozoan species. Approximately 60 taxa were recorded from the three different habitats: artificial, maerl bed, and rocky bottom. This study contributed with samples for DNA barcoding of 31 of the species. With additional DNA barcodes produced during the HABFA project, approximately 17% of the known Bryozoan diversity in Norwegian waters is represented in the DNA reference library. Five of the recorded species are considered alien species, all exclusively recorded from the artificial substrate.

4.1 Occurrence and distribution of shallow water species

Table 2 present the occurrences of species from all locations. Some species are frequently observed in almost all sampled habitats and locations. Most evident here are the *Electra pilosa, Membranipora membranacea* and *Cryptosula pallasiana.* These species are sampled in all habitats except the maerl bed habitat (Table 2). *Electra pilosa* and *M. membranacea* are well recognized bryozoan species known by most marine biologists. About 60% of the species were rarely recorded, being observed in as few as one to two of the locations (Table 2). One reason for these rare observations is most likely the limited sampling in each location. This study used samples from many locations to ensure effective mapping of the occurrence and distribution of species covering substantial parts of the Norwegian coast.

Species occurrence in the different habitats along the coast

This study has clearly provided new and updated information about occurrence and distribution of bryozoans in shallow Norwegian waters. Some of the most important observations are here discussed. The artificial habitats have recorded species from all three orders (Table 2). From artificial habitats, four taxa were recorded in Ørland, seven in Kristiansund, and ten in Bergen. The increase in species recorded from Ørland to Bergen can be because of an increase in the species diversity following the coast. However, it can also be caused by an increasing level of knowledge from the earliest to the most recent sampling. The sampling in Bergen was conducted during a Bryozoa workshop, where one actively searched for bryozoan species together with bryozoan experts involved in the HABFA project, Dr. Joanne Porter and Prof. Piotr Kuklinski. While the Ørland samples were collected when searching for every invertebrate, this could have resulted in bryozoan species getting overlooked. There were also some variances in the amount of sampling in each location. In Bergen, two somewhat geographically distant locations were sampled, while in Ørland and Kristiansund, there was only one sampling in artificial habitat.

The PolyPort samples south of Bergen contained a different species composition compared to the sampling in the Bergen area and further north. In particular, the samples from the Stavanger area stand out, with 22 recorded taxa. Some species are only recorded in Stavanger, such as species of the Bugulidae family (Table 2). This includes *Crisularia plumosa* and the doorknocker species *B. simplex. Crisularia plumosa* have only been recorded north of Kristiansand by Immanuel Vigeland from Hitra and Ørland in the 1920s according to the NBIC species map; these specimens are stored at the NTNU-VM (Artskart.artsdatabanken.no, 2022). Be noted that there may be recordings of these species that are not included in this list. According to Hayward and Ryland (1998), these species are often associated with artificial habitats. Stavanger contained a specimen of the Ctenostome *Amathia* sp. (formerly known as *Bowerbankia* sp.); species of *Amathia* are often abundant in artificial habitats (Hayward, 1985). This genus was only recorded in the Stavanger region, but the specimens identified as Ctenostomatida indet. or Stolonifera indet., from artificial habitats could be *Amathia* sp. Because of limited knowledge of these species, the specimens were, in many cases, not identified as far as genus or species.

Some of the sampling locations from PolyPort had few recordings of species. Only one species is recorded from the Oslo samples, *Conopeum* cf. *reticulum.* This species was only present in the PolyPort samples and is also recorded in Porsgrunn and Sandefjord. Since this is sampling conducted by others, one does not know how the sampling was performed. With different people sampling, this could have resulted in variations in the number of bryozoans sampled or the number of stations at every location. It is also worth mentioning that the PolyPort project's main aim was to study polychaetes and were probably not actively searching for bryozoans. And like Nordgaard (1894) wrote, if one is not actively searching for bryozoans, they can easily be overlooked. Another typical problem is that bushy and erect bryozoan species can get confused with hydrozoans because of their structural similarities. This also happened early in this study, where specimens of *Scruparia ambigua* were sorted as Hydrozoa. Bryozoans may be present in material identified as Hydrozoa from the PolyPort project.

The maerl bed habitat samples from Ørland and Bergen contained a diverse group of bryozoans, with approximately 23 taxa. Species are from the Cheilostome and Cyclostome species, but not any Ctenostome, the gelatinous order. This habitat is affected by currents and continuous movement of the substrate. The Ctenostome species may be too fragile for this. The fragile nature of these species is also not ideal for the sampling method, using a triangular dredge. Compared to the sampling conducted in the artificial and rocky bottom habitats, where most samples were gathered by hand. The common species *C. pallasiana* was not observed in this habitat; this is a common fouling species often recorded in artificial habitats and limited to the mean tide level (MTL) and upper sublittoral zone (Hayward & Ryland, 1999). The maerl bed habitats here are most likely too deep for this species. It can also be an indicator that the currents and movements of the maerl are too disturbing for this species. The colonies of *C. pallasiana* from other habitats were often quite large, while the observation from this habitat was that the overall size of the colonies of all species were small. Most likely because of the structural shape and size of the substrate, spiky fragments of maerl of different sizes. Most of the recorded species were encrusting species. The continuous movement of the substrate and surrounding water masses can be a reason for this. The bushy and erect species may be too fragile. The specimens recorded of the erect *S. ambigua* were only observed attached to red or brown algae. These pieces of algae could be displaced by the currents from other habitats. The strong currents increase the amount of food available for the filter feeding bryozoans and can have caused the overall high number of bryozoan species. Alien species were not observed in these samples.

There are only gathered samples from rocky bottom habitats in Ørland. One does not get a comparative basis for this habitat. The species present in this habitat from Ørland was a diverse group of bryozoan species from all orders. This habitat was the only one with records of *Alcyonidium*, the ctenostome species (Table 2). According to Hayward (1985), both following *Alcyonidium* species species are observed intertidal, *A. gelatinosum* probably limited to algal substrata, most often on *Fucus serratus*. *Alcyonidium hirsutum* is often observed on lower shore macroalgae (Hayward, 1985). *Alcyonidium* species are characterized as difficult not only to differentiate between, but also to define each species. Studies have revealed some cryptic speciation. *Alcyonidium hirsutum,* for instance, consists of at least five genetically distinct species (Hayward, 1985). Most of the sampling in this study is from artificial habitats. These are "new" habitats, and with extensive globalizing of humans and human impact, these were prioritized in this study.

4.2 Alien species

All the alien species found in this study were recorded in artificial habitats. This further supports the theory that artificial habitats as such have increased pressure of alien species. Areas with high pressure of boats, ships, and recreational boating, can have bryozoan species attached to them or larvae in the ballast water. When these are transferred from one area to another, the bryozoans also get transferred (Dick et al., 2020). The increase in ship traffic and the amount of garbage and materials disposed in the oceans by humans (Carlton, 1996; Carlton & Geller, 1993) have led to an increase in the frequency and speed of dispersal of marine organisms over long distances (Dick et al., 2020). Many of the sampling done in habitats here characterized as artificial, is from marinas for leisure boating. Therefore, one can discuss how the regional spread of species is facilitated by recreational boat traffic. Our results point towards this being an evident way species get transferred.

The alien species *S. japonica* is characterized as a high-risk species in the Alien species list. This species has a high invasion potential, and the ecological effect is unsure. Figure 24 illustrates *S. japonica* growing on rope together with other bryozoan species. Here one could observe that *S. japonica* grew on top of *C. pallasiana*. Which naturally can interfere with this species' ability to feed and disperse. Eventually, leading to the death of this colony. Therefore, one can say that this species can have an ecological effect on other native species when competing for the available substrate to colonize (Centurión & Gappa, 2011).

There are no certain records of *T. inopinata* in this study. A big reason being the lack of knowledge and experience in identification of the Candidae family. This was one of the species found by Porter et al. (2015) on their research cruise in both Florø and Kristiansund and was therefore expected to be present in both recent samples and the PolyPort material. The specimens identified as Candidae in this study should be further examined to explore the occurrence of *T. inopinata*, and related species of *Tricellaria*. Results from the DNA barcoding uncovered a misidentification of a specimen, meaning that there is a possible record of *T. inopinata* in the material from Bergen; this is further discussed in chapter 4.4, together with the possibility of another alien species of *Tricellaria* from HABFA material.

One can here also discuss the term cryptogenic species. These are species that are neither native nor introduced; this because of the global movement of humans, and a lack of data to support the origin of a species (Carlton, 1996). With species present in two or more ocean basins or on either side of an ocean basin. Extensive human impact, such as ship traffic or oyster movements for cultivation, makes it difficult to decide where the species' native origin is (Carlton, 1996). The species here characterized as alien species can be cryptogenic species. There has not been any extensive mapping of bryozoan species in Norway since the mid-20th century. Therefore, it is difficult to differentiate which species are native, with no basis for comparison.

A critical aspect of recording these alien species is sampling for DNA barcoding. Sequences of the recorded specimens can be compared to sequences from specimens sampled in other geographic areas. This would further guarantee that these are alien species. Having reference sequences in a DNA library would aid future environmental surveys, e.g., by confirming the presence of species in an area using environmental DNA (van den Heuvel-Greve et al., 2021). This could also aid in the study of finding the native origin of a species and tracing the pathways of spreading of these invasive species (Ahyong et al., 2017).

4.3 Morphological identification and challenges when sampling bryozoans

In the work of identification in this study, morphological identification was the primary method used. There are some problems related to this method. Lack of knowledge or poor literature can result in misidentifications. The doorknocker species *Fenestrulina delicia*, have long been misidentified as *Fenestrulina malusii* because this is the only *Fenestrulina* species mentioned in the identification literature by Hayward and Ryland (1998) (De Blauwe et al., 2014). *Fenestrulina delicia* was also misidentified as *F. malusii* at first in this study. It can be the case that alien species are overlooked because they are not included in standard identification literature for the area. This goes for *J. mutabilis, S. japonica,* and *T. inopinata* which are also not mentioned in the literature by Hayward and Ryland (1998). Although, together with *F. delicia* mentioned in the article of Porter et al. (2015), this emphasizes the importance of getting updated knowledge on species that may be present in Norway.

As mentioned earlier, some genera/families are harder to identify than others. *Tubulipora* is only identified to genus level (Table 2). This is a genus well known as problematic, and experts in the bryozoan field also often stop at *Tubulipora* sp. The shape of the ooeciostome, the opening of the gonozooids (Fig. 9B), is a trait used for species identification. However, the ooeciostome is often missing or damaged, making identification difficult (Hayward & Ryland, 1985). One observation from this study was that many of the colonies of *Tubulipora* sp. from the maerl bed habitat were small. Small colonies often are difficult to differentiate between (Hayward & Ryland, 1985). Based on the large amounts of *Tubulipora* sp. present in the material and the variety in morphological details observed, one can estimate that this most likely is several different species.

SEM photography is often used as a tool in morphological identification. If this had been used in this study, one could have had a more certain identification, and possibly recorded more species.

4.4 DNA barcoding

DNA barcodes have been produced for approximately 50 bryozoan species, representing 17% of the confirmed Norwegian bryozoan species diversity, according to the *Knowledge Status for Species Diversity* Report (Elven & Søli, 2021). There are some observations in the NJ-tree worth mentioning. There were also some challenges regarding the methodical implementations of the tissue sampling. This may be confirmed by deviating results in BOLD. Some specimens were flagged as contaminated, and some did not receive a barcode sequence. These were not included in the finished NJ-tree. The success rate of the bryozoan species in BOLD from the HABFA project is approximately 48%. Meaning that of the specimens sampled, about half got a valid barcode.

Analysis of NJ-tree

There are about 22 clades. The common *M. membranacea* placed in an evident clade (Fig. 32), with specimens from different habitats and locations, which is strong evidence that this is the same species, with no cryptic speciation. The species *C. eburnea, M. ciliata* and *C. hyalina* are all placed in two sister clades, which could indicate cryptic speciation. *Celleporella hyalina* is a known species complex (Waeschenbach et al., 2012).

The common species *E. pilosa* has few successful sequences, placed further from each other in the tree. There is limited genetic knowledge of this species; this may be because of COI not being a functioning marker. In a phylogenetic study of the species formerly known as *Electra crustulenta* (now *Einhornia crustulenta*), the ribosomal 16S mtDNA and 18S nDNA were used instead (Nikulina, 2008). This marker could give more results than the COI marker for *E. pilosa*, and other problematic species.

Species of *Tricellaria* have a chaotic placement in the tree; they position themselves in three different clades. The *Tricellaria* genus has a complicated taxonomy. A misidentification was discovered in the results. The specimen (ZMBN 140130) from Bergen was identified as "*Cradoscrupocellaria reptans"* but placed between *Tricellaria* and *T. inopinata*, in the same clade as the *T. inopinata* (Fig. 32). The voucher has been investigated, and the conclusion is that this specimen is of the *Tricellaria* genus and possibly the alien species *T. inopinata*. Mistakes like this can happen and show the importance of keeping good vouchers of the specimens, and how DNA barcoding can aid in identification.

Schizoporella species are present in the NJ-tree, both the alien species *S. japonica* and one specimen identified as *Schizoporella* sp. Bryozoan experts involved in the HABFA project, Joanne Porter and Piotr Kuklinski, were also not able to identify the *Schizoporella* sp. to any known species. *Schizoporella japonica* is placed in one clade, while the *Schizoporella* sp. placed as sister to this clade, supporting the identification to the genus *Schizoporella* (Fig. 34).

Only one viable sequence was produced for the genus *Alcyonidium* (Fig. 33). This is in accordance with earlier trials in the HABFA project and was as expected. Previous studies have indicated the presence of cryptic species in this genus (Hayward, 1985), and it would therefore be valuable finding new primers to produce good barcodes. It is worth mentioning that if one was to explore the presence of cryptic species, one would sample many more specimens of each species from as many widespread and different localities as possible. This was not the aim of this project.

The sequences produced in BOLD were analysed together with relevant GenBank data. This was highly interesting regarding the specimens characterized as alien species. Here one could see that some of the specimens identified as *J. mutabilis* or *S. japonica* placed in the same clades as specimens of the same species from other geographical locations. There were also a match of a sequence of *Amathia* sp. (ZMBN 138087) and a sequence of an undescribed *Amathia* species from the Orkney Islands (Scotland) (KM373434) (Waeschenbach et al., 2015). The genetic results can indicate another possible alien species of *Tricellaria* in Norwegian waters. One of the clades matches with a sequence of the species *Tricellaria occidentalis* (Trask, 1857), reported from China. *Tricellaria occidentalis* is morphologically similar *T. inopinata,* and some scientists have rejected *T. inopinata* and *T. occidentalis* as two separate species*,* while others accept them as two separate species (Ambrogi, 2022). Further proving the undiscovered species diversity in Norway.

Methodical challenges

When sampling for bryozoan tissue, one became aware of some challenges. For instance, to get substantial tissue, one had to extract multiple polypides compared to other animals where one can take a single part of one individual. With crustaceans, for example, one can take one leg. Going back and forth to take multiple samples could increase the risk of contamination since the different zooids could contain different contaminating organisms.

The bryozoan colonies serve as housing for many animals (Fig. 5). Some of the colonies sampled in this study had evident epifaunal residents, such as nematodes, bottle-animalcules (Fig. 33A), or algae (Fig. 33B). Another problem is that bryozoans tend to grow on top of each other (Fig. 15, 19B, 19G, 24), risking contamination of other bryozoan species. The organisms inhabiting the bryozoans were often observed in the microscope, especially when looking at fresh material. The substrate of the bryozoans also varied; while some were attached to rocks or shells, making it easy to scrape off the colony with little pollution of the sample, others were attached to fragile algae (Fig. 33C). Risking the alga breaking off and contaminating the sample. The COI gene is an effective gene marker commonly used in barcoding of brown and red macroalgae (Saunders, 2005), meaning that contamination of algae in the tissue sample could give invalid results.

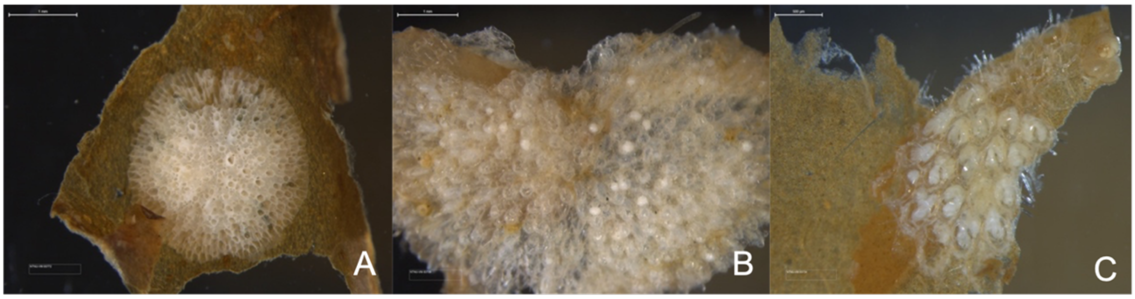


Figure 33: Different visible challenges when sampling tissue from bryozoan species. (A) *Patinella verrucaria* inhabited by 'bottle animalcules' (NTNU-VM 83772), (B) *Celleporella hyalina* polluted by algae (NTNU-VM 83708), (C) *Callopora* sp. attached to a fragile alga (NTNU-VM 83734). Photo: Tine Mathilde Benjaminsen.

There were also some variations in getting tissue out of the calcified skeleton. In some species, one could easily pick out the polypide (Fig. 12). In contrast, others were more calcified, with small polypides. The size of the colonies also varied, making it hard to keep a good part of the colony left to serve as a voucher. In some cases, the voucher left was small and somewhat ruined.

For further tissue sampling of bryozoans, one can think of some possible improvements. First and foremost, it is advantageous to be aware of the challenges mentioned here when choosing specimens for sampling. The specimens should be clean, with as few contaminants as possible. The colonies should be of such a size that one can spare a piece, still leaving a decent voucher. This is to ensure good voucher specimens in the museum material so that one can look at morphological characters in the future. Regarding the difference between sampling fresh material and fixated material, one does not see any clear benefits with either method. However, when fixating the colonies, one observed that some organisms escaped the bryozoan colonies. A combination where the material is kept fresh until right before sampling, then submerging the sample in ethanol could be a suitable method. The tissue is kept fresh, and some contaminants could have escaped.

The Bryozoa phylum consists of many different species with high taxonomic differences and does not surprisingly have a high degree of COI differences. The fundamental problem with DNA barcoding of bryozoans is the lack of a universal COI primer set. One can often experience invalid results using the universal primers. The COI sequences available now are of a small portion of bryozoans, which could impede the design of universal primers (Lee et al., 2011). Therefore, it is essential to explore a higher amount of different bryozoan species to ensure a greater database and the construction of functional primers.

The importance of DNA barcoding

This study has contributed with samples for DNA barcoding and by doing this have uncovered valuable information. DNA barcoding is an essential tool in researching bryozoan species occurrence and distribution. It can uncover cryptic speciation, misidentifications, or species new to Norwegian waters. Such as the match of a specimen of *Amathia* sp. with an undescribed species in the Orkney Islands. This tool uncovers new information, creating the foundation for further studies on the bryozoan species. By contributing with samples to a barcode sequence library, one also aids future studies and environmental surveys.

4.5 Future studies

This study is performed in accessible habitats, using simple methods. However, the results are extensive, with recordings of many species, including species not yet recorded in Norway. Bryozoan diversity and species distributions have been little studied in Norwegian waters for decades, and little effort can give extensive new and updated information. Additional sampling is needed to cover a larger percentage of the confirmed Norwegian species in a DNA barcode reference library.

More sampling in different habitats along the coast is needed. Recent studies on bryozoan distribution in Norway are mostly comprised of the studies of Porter et al. (2015); Ryland (1963), and this study. These are mainly sampled in the area from Bergen to Trondheim. We need studies of bryozoan species distribution along the entire coast of Norway. Porter et al. (2015) and this master's study have together recorded five alien species that were not originally recorded in Norway. Further underlining that one can substantially increase the knowledge of bryozoan diversity and species distribution in Norway with some effort. Moreover, the results imply that there are more *Tricellaria* alien species present in Norwegian waters. This should be further studied, and new sampling should be conducted, together with investigating samples identified to the Candidae family stored at the university museums. The species *Fenestrulina delicia* and *Bugulina simplex* should also be further studied; there is a need for both SEM scanning and DNA barcoding of these species. Sampling should be conducted in all seasons to increase the chance of finding all present species, such as species of the Bugulidae family, including some alien species (Ryland et al., 2011). Also, to gain knowledge on reproduction: such as the timing of brooding in different species and morphological characters such as colour of eggs and the structure of ovicells, since these also are seasonal.

Future marine projects should sample a variety of species. The importance of this became evident in this study, where samples gathered in the PolyPort project contributed by increasing the distribution of samples along the coast. These are a by-product of a study that primarily focused on polychaetes. The potential discovery of a species new to Norwegian waters (*Bugulina simplex*) was also from the PolyPort samples. Sampling more than the group in focus increases the data of the museums and could aid in future studies. At the same time, we need fieldwork dedicated to bryozoan species. As mentioned earlier, bryozoans can easily be overlooked when one is not actively searching for them.

5. Concluding remark

This study has shown the diversity of the bryozoan species in Norwegian shallow water habitats. Sampling in accessible habitats, with simple sampling methods, resulted in about 60 different species recorded, five of them alien species, with the first recordings of alien species *B. simplex* and *F. delicia* in Norwegian waters. All alien species were sampled in artificial habitat.

While performing DNA barcoding, one became aware of challenges, both in tissue extraction and in the construction of DNA barcode sequences. The ecological role of the bryozoan species as housing for other animals, and living attached to alga, results in a high risk of contamination. This is somewhat reflected in the current DNA barcode reference library, where approximately 17% of the known bryozoans in Norway have a valid DNA barcode sequence. Further proving the need for more sampling and work on the bryozoan species.

References

Ahyong, S. T., Kupriyanova, E., Burghardt, I., Sun, Y., Hutchings, P. A., Capa, M., & Cox, S. L. (2017). Phylogeography of the invasive Mediterranean fan worm, Sabella spallanzanii (Gmelin, 1791), in Australia and New Zealand. *Journal of the Marine Biological Association of the United Kingdom*, *97*(5), 985-991. https://doi.org/10.1017/S0025315417000261

Ambrogi, A. O. (2022). *Tricellaria inopinata. In: Invasive Species Compendium* https://www.cabi.org/isc/datasheet/109093#tosummaryOfInvasiveness

Artskart.artsdatabanken.no. (2022). *Funndata fra: NTNU-Vitenskapsmuseet, Norsk institutt for vannforskning, Tromsø museum Universitetsmuseet*. Retrieved 23.05.2022 from https://artskart.artsdatabanken.no/

Bakken, T., Hårsaker, K., & Daverdin, M. (2022). *Marine invertebrate collection NTNU University Museum.* Version (Version 1.1188) [Occurrence dataset]. GBIF.org. https://doi.org/10.15468/ddbs14

Carlton, J. T. (1996). Biological invasions and cryptogenic species. *Ecology*, *77*(6), 1653-1655. https://doi.org/10.2307/2265767

Carlton, J. T., & Geller, J. B. (1993). Ecological Roulette: The Global Transport of Nonindigenous Marine Organisms. *Science (American Association for the Advancement of Science)*(261(5117)), 78–82. https://doi.org/10.1126/science.261.5117.78

Centurión, R., & Gappa, J. L. (2011). Bryozoan assemblages on hard substrata: species abundance distribution and competition for space. *Hydrobiologia*, *658*(1), 329-341. https://doi.org/10.1007/s10750-010-0503-5

De Blauwe, H., Kind, B., Kuhlenkamp, R., Cuperus, j., van der Weide, B. E., & Kerckhof, F. (2014). Recent observations of the introduced Fenestrulina delicia Winston, Hayward & Craig, 2000 (Bryozoa) in Western Europe. *Studi Trent. Sci. Nat.*, *94*, 45-51.

Dick, M. H., Waeschenbach, A., Trott, T. J., Onishi, T., Beveridge, C., Bishop, J. D., Ito, M., & Ostrovsky, A. N. (2020). Global distribution and variation of the invasive cheilostome bryozoan Cribrilina mutabilis. *Zoological science*, *37*(3), 217-231. https://doi.org/10.2108/zs190142

Elven, H., & Søli, G. (2021). *Kunnskapsstatus for artsmangfoldet i Norge 2020. Utredning for Artsdatabanken 01/2021*.

Gederaas, L., Moen, T. L., Skjelseth, S., & Larsen, L. K. (2012). *Fremmede arter i Norge – med norsk svarteliste 2012*. https://www.artsdatabanken.no/Files/13964/Fremmede_arter_i_Norge___med_norsk_svarteliste_2012

Gordon, D. P. (1972). Biological relationships of an intertidal bryozoan population. *Journal of natural History*, *6*(5), 503-514. https://doi.org/10.1080/00222937200770461

Hansson, H. G. (1997). *Biographical Etymology of Marine Organism Names. V & W*. Retrieved 16.05.2022 from https://www.bemon.loven.gu.se/petymol.vw.html

Hayward, P. J. (1985). *Ctenostome Bryozoans* (Vol. No. 33). Field Studies Council.

Hayward, P. J., & Ryland, J. S. (1985). *Cyclostome Bryozoans* (Vol. No. 34). Field Studies Council.

Hayward, P. J., & Ryland, J. S. (1998). *Cheilostomatous Bryozoa, Part 1: Aeteoidea - Cribrilinoidea* (Vol. No. 10). Field Studies Council.

Hayward, P. J., & Ryland, J. S. (1999). *Cheilostomatous Bryozoa, Part 2: Hippothoidea - Celleporidea* (Vol. No. 14). Field Studies Council.

Hebert, P. D., Ratnasingham, S., & De Waard, J. R. (2003). Barcoding animal life: cytochrome c oxidase subunit 1 divergences among closely related species. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, *270*(suppl_1), S96-S99. https://doi.org/10.1098/rsbl.2003.0025

Hebert, P. D. N., Gregory, T. R., & Savolainen, V. (2005). *The Promise of DNA Barcoding for Taxonomy* [852-859]. Washington, D.C.

Ito, M., Onishi, T., & Dick, M. H. (2015). Cribrilina mutabilis n. sp., an Eelgrass-Associated Bryozoan (Gymnolaemata: Cheilostomata) with Large Variationin Zooid Morphology Related to Life History. *Zoolog Sci*, *32*(5), 485-497. https://doi.org/10.2108/zs150079

Kongsrud, J. A., Malaquias, M. A. E., & Kongshavn, K. (2022). *Invertebrate collections, UiB*. Version (Version 1.562) [Occurrence dataset]. University of Bergen. https://doi.org/10.15468/f2y3bf

Korshunova, T., Picton, B., Furfaro, G., Mariottini, P., Pontes, M., Prkić, J., Fletcher, K., Malmberg, K., Lundin, K., & Martynov, A. (2019). Multilevel fine-scale diversity challenges the 'cryptic species' concept. *Scientific Reports*, *9*(1), 6732. https://doi.org/10.1038/s41598-019-42297-5

Lang, W. D. (1921). *Catalogue of the Fossil of Bryozoa (Polyzoa) in the Department of Geology, British Museum (Natural History)*. British Museum London, UK.

Lee, H.-J., Kwan, Y.-S., Kong, S.-R., Min, B.-S., Seo, J.-E., & Won, Y.-J. (2011). DNA barcode examination of Bryozoa (Class: Gymnolaemata) in Korean seawater. *Animal Systematics, Evolution and Diversity*, *27*(2), 159-163. https://doi.org/10.5635/KJSZ.2011.27.2.159

Lidgard, S. (2008). Predation on marine bryozoan colonies: taxa, traits and trophic groups. *Marine Ecology Progress Series*, *359*, 117-131. https://doi.org/10.3354/meps07322

Lockwood, J. L., Hoopes, M. F., & Marchetti, M. P. (2013). *Invasion ecology*. John Wiley & Sons.

Lombardi, C., Taylor, P. D., & Cocito, S. (2014). Bryozoan constructions in a changing Mediterranean Sea. In *The Mediterranean Sea* (pp. 373-384). Springer. https://doi.org/10.1007/978-94-007-6704-1_21

Miller, M. C. (1961). Distribution and Food of the Nudibranchiate Mollusca of the South of the Isle of Man. *Journal of Animal Ecology*, *30*(1), 95-116. https://doi.org/10.2307/2116

Mohammed, A., & Abdullah, A. (2018). Scanning electron microscopy (SEM): A review. Proceedings of the 2018 International Conference on Hydraulics and Pneumatics—HERVEX, Băile Govora, Romania,

Moritz, C., Cicero, C., & Charles, G. (2004). *DNA Barcoding: Promise and Pitfalls* [e354]. San Francisco, Calif.

NBIC. (2018). *Fremmedartslista 2018*. Retrieved 01.04 from https://www.artsdatabanken.no/fremmedartslista2018

NBIC. (2019). *Evertebrater på hardbunn*. Retrieved 03.05.2022 from https://www.artsdatabanken.no/Pages/260984/Evertebrater_paa_hardbunn_br__small_15-18__small_

Nikulina, E. A. (2008). Taxonomy and ribosomal DNA-based phylogeny of the Electra crustulenta species group (Bryozoa: Cheilostomata) with revision of Borg's varieties and description of Electra moskvikvendi sp. nov. from the Western Baltic Sea. *Organisms Diversity & Evolution*, *8*(3), 215-229. https://doi.org/10.1016/j.ode.2007.10.001

NorBOL. (2021a). *About us*. Retrieved 03.05.2022 from https://www.norbol.org/deltakere/

NorBOL. (2021b). *Hva er DNA strekkoding*. Retrieved 03.05.2022 from https://www.norbol.org/hva-er-dna-strekkoding/

Nordgaard, O. (1894). Systematisk fortegnelse over de i Norge hidtil observerede arter af marine polyzoa. *Bergen museums Aarbog*, *I. Cheilostomata*.

Oug, E., Gulliksen, B., Jelmert, A., J.Sundet, & Falkenhaug, T. (2019). Schizoporella japonica, vurdering av økologisk risiko. In *Fremmedartslista 2018. Artsdatabanken*. Artsdatabanken. https://www.artsdatabanken.no/fab2018/N/3077

Perry, F. T.-W., H. (2018). *Maerl beds. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews*. Marine Biological Association of the United Kingdom. Retrieved 25.05.2022 from https://www.marlin.ac.uk/habitat/detail/255

Porter, J. (2012). *Seasearch Guide to Bryozoans and Hydroids of Britain and Ireland*. Marine Concervation Society.

Porter, J. S., Jones, M. E. S., Kuklinski, P., & Rouse, S. (2015). First records of marine invasive non-native Bryozoa in Norwegian coastal waters from Bergen to Trondheim. *Bioinvasions Records*, *4*(3), 157-169. https://doi.org/10.3391/bir.2015.4.3.02

Ratnasingham, S., & Herbert, P. N. D. (2007). BARCODING: bold: The Barcode of Life Data System (http://www. barcodinglife. org). *Molecular Ecology Notes*, *7*(3).

Rinde, E., Gitmark, J. K., Hjermann, D. Ø., Fagerli, C. W., Kile, M. R., & Christie, H. (2017). *Utvikling av metodikk for overvåking av fremmede marine arter*. NIVA.

Ryland, J., Bishop, J., De Blauwe, H., El Nagar, A., Minchin, D., Wood, C., & Yunnie, A. (2011). Alien species of Bugula (Bryozoa) along the Atlantic coasts of Europe. *Aquatic Invasions*, *6*(1), 17-31. https://doi.org/10.3391/ai.2011.6.1.03

Ryland, J. S. (1963). Systematic and biological studies on Polyzoa (Bryozoa) from western Norway. *Sarsia*, *14*(1), 1-59. https://doi.org/10.1080/00364827.1963.10409518

Ryland, J. S. (2017). Bryozoa. In P. J. Hayward & J. S. Ryland (Eds.), *Handbook of the Marine Fauna of North-West Europe* (2 ed., pp. 800). Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199549443.001.0001

Ryland, J. S., Holt, R., & Loxton, J. (2014). First occurrence of the non-native bryozoan Schizoporella japonica Ortmann (1890) in Western Europe. *Zootaxa*, *3780*(3), 481-502.

Sakshaug, E. (2009). Ole Nordgaard. In (Vol. 2022). Norsk biografisk leksikon at snl.no.

Saunders, G. W. (2005). Applying DNA barcoding to red macroalgae: a preliminary appraisal holds promise for future applications. *Philosophical transactions of the Royal Society B: Biological sciences*, *360*(1462), 1879-1888. https://doi.org/10.1098/rstb.2005.1719

Seymour, M. (2021). Environmental DNA Advancing Our Understanding and Conservation of Inland Waters∗. In *Reference Module in Earth Systems and Environmental Sciences*. Elsevier. https://doi.org/10.1016/B978-0-12-819166-8.00070-0

Stokkan, J., Thorsnæs, G., & Een de Amoriza, S. (2022). Kristiansund. In *Store norske leksikon*. snl.no.

Taylor, P. D. (2001). *Cyclostome Bryozoans*. Department of Palaeontology, The Natural History Museum. Retrieved 23.05.2022 from https://nmita.rsmas.miami.edu/database/bryozoa/cyclointro.htm

Taylor, P. D., Lombardi, C., & Cocito, S. (2015). Biomineralization in bryozoans: present, past and future. *Biological Reviews*, *90*(4), 1118-1150. https://doi.org/10.1111/brv.12148

van den Heuvel-Greve, M. J., van den Brink, A. M., Glorius, S. T., de Groot, G. A., Laros, I., Renaud, P. E., Pettersen, R., Węsławski, J. M., Kuklinski, P., & Murk, A. J. (2021). Early detection of marine non-indigenous species on Svalbard by DNA metabarcoding of sediment. *Polar Biology*, *44*(4), 653-665. https://doi.org/10.1007/s00300-021-02822-7

Waeschenbach, A., Porter, J. S., & Hughes, R. N. (2012). Molecular variability in the Celleporella hyalina (Bryozoa; Cheilostomata) species complex: evidence for cryptic speciation from complete mitochondrial genomes. *Molecular Biology Reports*, *39*(9), 8601-8614. https://doi.org/10.1007/s11033-012-1714-9

Waeschenbach, A., Vieira, L. M., Reverter-Gil, O., Souto-Derungs, J., Nascimento, K. B., & Fehlauer-Ale, K. H. (2015). A phylogeny of V esiculariidae (B ryozoa, C tenostomata) supports synonymization of three genera and reveals possible cryptic diversity. *Zoologica scripta*, *44*(6), 667-683. https://doi.org/10.1111/zsc.12130

Winston, J. E. (1984). Why bryozoans have avicularia: a review of the evidence. American Museum novitates; no. 2789.

WoRMS Editorial Board. (2022). *World Register of Marine Species. Available from https://www.marinespecies.org*. https://doi.org/10.14284/170

Appendix 1

Table A1: Overview of all specimens in this study, from the HABFA and PolyPort project. Specimens marked in yellow, are sampled for DNA barcoding. Object glass containing more than one species, have the in focus species' name in uppercase letters.

Specimen ID	Project	Collection date	Scientific name	Det.	Location	Lat/long	Depth (m)	Collectors
NTNU-VM 82130	HABFA	01.09.2021	Cryptosula pallasiana	Tine M. Benjaminsen	Ørland	63.662128, 9.325847	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 82101	HABFA	01.09.2021	Electra pilosa, spirorbis sp.	Tine M. Benjaminsen	Ørland	63.662128, 9.325847	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83700	HABFA	01.09.2021	Flustrellidra hispida	Tine M. Benjaminsen	Ørland	63.662128, 9.325847	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83691	HABFA	01.09.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.662128, 9.325847	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83755	HABFA	01.09.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.659343, 9.332958	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 82085	HABFA	01.09.2021	FLUSTRELLIDRA HISPIDA, Hydrozoa indet, bivalvia indet	Tine m. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 82120	HABFA	01.09.2021	ALCYONODIUM GELATINOSUM, Electra pilosa	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83740	HABFA	01.09.2021	ALCYONIDIUM HIRSUTUM, Electra pilosa	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83741	HABFA	01.09.2021	ALCYONIDIUM SP., Electra pilosa	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83742	HABFA	01.09.2021	ALCYONIDIUM HIRSUTUM., Electra pilosa, hydrozoa indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83743	HABFA	01.09.2021	ALCYONIDIUM SP., Electra pilosa	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83744	HABFA	01.09.2021	ALCYONIDIUM HIRSUTUM, Electra pilosa, hydrozoa indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83745	HABFA	01.09.2021	ALCYONIDIUM HIRSUTUM, ALCYONIDIUM GELATINOSUM., Electra pilosa, hydrozoa indet, bivalvia indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83746	HABFA	01.09.2021	ALCYONIDIUM GELATINOSUM., Electra pilosa, hydrozoa indet	Tine M. Benjaminsen, J. Porter	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83747	HABFA	01.09.2021	ALCYONIDIUM HIRSUTUM , Electra pilosa, hydrozoa indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83748	HABFA	01.09.2021	Alcyonidium hirsutum	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker

NTNU-VM 83756	HABFA	01.09.2021	MEMBRANIPORA MEMBRANACEA, ELECTRA PILOSA, spirorbis indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83757	HABFA	01.09.2021	ELECTRA PILOSA, Dynamena sp.	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83758	HABFA	01.09.2021	MEMBRANIPORA MEMBRANACEA, ELECTRA PILOSA, Hydrozoa indet	Tine M. Benjaminsen	Ørland	63.647756, 9.343139	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 82091	HABFA	01.09.2021	CRYPTOSULA PALLASIANA, Electra pilosa	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83710	HABFA	01.09.2021	Juxtacribrilina cf. mutabilis	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83690	HABFA	01.09.2021	MEMBRANIPORA MEMBRANACEA, ELECTRA PILOSA, Hydrozoa indet	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83670	HABFA	01.09.2021	JUXTACRIBRILINA CF. MUTABILIS, Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83680	HABFA	01.09.2021	MEMBRANIPORA MEMBRANACEA, ELECTRA PILOSA	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83710	HABFA	01.09.2021	Juxtacribrilina cf. mutabilis	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83754	HABFA	01.09.2021	ELECTRA PILOSA, Hydrozoa indet.	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83711	HABFA	01.09.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.638248, 9.330396	0,5	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken, Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83701	HABFA	02.09.2021	MICROPORELLA CILIATA, Cerithiidae indet	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83716	HABFA	02.09.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83706	HABFA	02.09.2021	CELLEPORELLA HYALINA, Leptothecata indet.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83696	HABFA	02.09.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83686	HABFA	02.09.2021	Microporellidae indet.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83735	HABFA	02.09.2021	CALLOPORA SP., Hydrozoa indet.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83736	HABFA	02.09.2021	SCRUPARIA SP., Electra pilosa, Bivalvia indet	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83737	HABFA	02.09.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83738	HABFA	02.09.2021	DISPORELLA HISPIDA, Crisiella producta, Electra pilosa	Tine M. Benjaminsen, J porter	Ørland	63.635507, 9.313134	2-6m	August Nymoen

NTNU-VM 83739	HABFA	02.09.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83752	HABFA	02.09.2021	ELECTRA PILOSA, Balanidae indet.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83753	HABFA	02.09.2021	MEMBRANIPORA MEMBRANACEA, Hydrozoa indet	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83776	HABFA	02.09.2021	Scruparia sp.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83779	HABFA	02.09.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83778	HABFA	02.09.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.635507, 9.313134	2-6m	August Nymoen
NTNU-VM 83749	HABFA	02.09.2021	Alcyonidium hirsutum, spirorbis sp	Tine M. Benjaminsen	Ørland	63.652269, 9.446865	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83751	HABFA	02.09.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.652269, 9.446866	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83788	HABFA	02.09.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.652269, 9.446867	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83784	HABFA	02.09.2021	schizoporella sp., cryptosula pallasiana	Tine M. Benjaminsen	Ørland	63.652269, 9.446868	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83785	HABFA	02.09.2021	schizoporella sp.	Tine M. Benjaminsen	Ørland	63.652269, 9.446869	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 83786	HABFA	02.09.2021	Cryptosula pallasiana	Tine M. Benjaminsen	Ørland	63.652269, 9.446870	0	Ina R. Bjørset, Karstein Hårsaker
NTNU-VM 82090	HABFA	02.09.2021	Alcyonidium hirsutum	Tine M. Benjaminsen	Ørland	63.651776, 9.414906	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken
NTNU-VM 82110	HABFA	02.09.2021	ALCYONIDIUM HIRSUTUM , Electra pilosa, spirorbis	Tine M. Benjaminsen	Ørland	63.651776, 9.414906	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken
NTNU-VM 82100	HABFA	02.09.2021	Alcyonidium hirsutum	Tine M. Benjaminsen	Ørland	63.651776, 9.414906	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken
NTNU-VM 83750	HABFA	02.09.2021	Electra pilosa, spirorbis sp.	Tine M. Benjaminsen	Ørland	63.651776, 9.414906	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken
NTNU-VM 83789	HABFA	02.09.2021	Electra pilosa, spirorbis sp.	Tine M. Benjaminsen	Ørland	63.651776, 9.414906	0	August Nymoen, Tine Benjaminsen, Marthe Ree Dille, Torkild Bakken
NTNU-VM 83790	HABFA	06.03.2022	Fenestrulina cf. delicia	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83791	HABFA	06.03.2022	CRYPTOSULA PALLASIANA, cheilostomatida indet	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83792	HABFA	06.03.2022	Schizoporella japonica	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83793	HABFA	06.03.2022	Schizoporella japonica	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83794	HABFA	06.03.2022	Schizoporella japonica	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83795	HABFA	06.03.2022	Juxtacribrilina mutabilis	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83796	HABFA	06.03.2022	Juxtacribrilina mutabilis	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen

NTNU-VM 83797	HABFA	06.03.2022	Cryptosula pallasiana	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83798	HABFA	06.03.2022	Electra pilosa	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83799	HABFA	06.03.2022	Cradoscrupocellaria reptans	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83800	HABFA	06.03.2022	Tubulipora sp.	Tine M. Benjaminsen	Kristiansund	63.12363, 07.75667	0,5	Tine M. Benjaminsen
NTNU-VM 83704	HABFA	06.10.2021	Lichenopora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83694	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83714	HABFA	06.10.2021	Plagiopecia patina	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83673	HABFA	06.10.2021	Celleporina calciformis	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83684	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83685	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83675	HABFA	06.10.2021	Scruparia ambigua	Ina R. Bjørset	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83676	HABFA	06.10.2021	Crisiella producta	J. Porter	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83362	HABFA	06.10.2021	bryozoa indet. ?		Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83707	HABFA	06.10.2021	Microporella ciliata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83687	HABFA	06.10.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83677	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83718	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83708	HABFA	06.10.2021	CELLEPORELLA HYALINA, Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83698	HABFA	06.10.2021	Callopora lineata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83688	HABFA	06.10.2021	Juxtacribrilina annulata	P. Kuklinski	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83678	HABFA	06.10.2021	Callopora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83719	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83709	HABFA	06.10.2021	Microporella ciliata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83699	HABFA	06.10.2021	CELLEPORELLA HYALINA, Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83689	HABFA	06.10.2021	Callopora lineata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83720	HABFA	06.10.2021	DISPORELLA HISPIDA, Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken

NTNU-VM 83721	HABFA	06.10.2021	Callopora craticula	P. Kuklinski	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83722	HABFA	06.10.2021	DISPORELLA HISPIDA, Scruparia ambigua, Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83723	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83724	HABFA	06.10.2021	Disporella hispida	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83725	HABFA	06.10.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83687	HABFA	06.10.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83726	HABFA	06.10.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83727	HABFA	06.10.2021	Callopora lineata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83728	HABFA	06.10.2021	Cyclostomatida indet	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83729	HABFA	06.10.2021	Cribrilina sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83730	HABFA	06.10.2021	AMPHIBLESTRUM FLEMINGII	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83731	HABFA	06.10.2021	Diplosolen obelium., Cheilostomatida indet	J. Porter	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83732	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83733	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83734	HABFA	06.10.2021	Callopora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83760	HABFA	06.10.2021	Celleporina sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83759	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83763	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83764	HABFA	06.10.2021	Microporella ciliata	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83765	HABFA	06.10.2021	FENESTRULINA MALUSII(1), Microporella ciliata(3), celleporella hyalina(2)	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83767	HABFA	06.10.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83362	HABFA	06.10.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83770	HABFA	06.10.2021	Patinella verrucaria	J. Porter	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83773	HABFA	06.10.2021	Patinella verrucaria	J. Porter	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83774	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken

NTNU-VM 83775	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83769	HABFA	06.10.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83777	HABFA	06.10.2021	Fenestrulina malusii	Tine M. Benjaminsen	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83787	HABFA	06.10.2021	Cribrilina annulata	P. Kuklinski	Ørland	63.665716, 9.34795	12	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83681	HABFA	06.10.2021	Callopora sp.	P. Kuklinski	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83671	HABFA	06.10.2021	Disporella cf. Hispida	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83712	HABFA	06.10.2021	CELLEPORINA CALCIFORMIS, Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83702	HABFA	06.10.2021	Callopora cf. Craticula	P. Kuklinski	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83692	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83682	HABFA	06.10.2021	Disporella hispida	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83713	HABFA	06.10.2021	Celleporina sp	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83672	HABFA	06.10.2021	Patinella verrucaria	J. Porter	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83703	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83693	HABFA	06.10.2021	SCRUPARIA AMBIGUA, Disporella hispida, Electra pilosa	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83683	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83715	HABFA	06.10.2021	Tubulipora sp.	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83705	HABFA	06.10.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83695	HABFA	06.10.2021	Electra pilosa	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83717	HABFA	06.10.2021	Lichenpordae indet	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83697	HABFA	06.10.2021	Scruparia ambigua	Ina R. Bjørset	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83679	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83761	HABFA	06.10.2021	Celleporella hyalina	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83762	HABFA	06.10.2021	Scruparia ambigua	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83766	HABFA	06.10.2021	Callepora sp.	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83768	HABFA	06.10.2021	Membranipora membranacea	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 83771	HABFA	06.10.2021	Patinella verrucaria	J. Porter	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken

NTNU-VM 83772	HABFA	06.10.2021	Patinella verrucaria	Tine M. Benjaminsen	Ørland	63.65985, 9.34621	10	Ina R. Bjørset, Torkild Bakken
NTNU-VM 81308	PolyPort	07.09.2018	Membranipora membranacea	T. M. Benjaminsen	Trondheim	63.43421N 10.37586E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 81297	PolyPort	11.09.2018	Electra pilosa	T. M. Benjaminsen	Bergen	60.39848N 5.31857E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81295	PolyPort	11.09.2018	Electra pilosa	T. M. Benjaminsen	Bergen	60.39852N 5.31200E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81296	PolyPort	11.09.2018	Electra pilosa	T. M. Benjaminsen	Bergen	60.39852N 5.31200E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81294	PolyPort	11.09.2018	Electra pilosa	T. M. Benjaminsen	Bergen	60.39199N 5.29172E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83859	PolyPort	11.04.2018	cheilostomatida indet.	T. M. Benjaminsen	Bergen	60.38874N 5.29863E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83860	PolyPort	11.04.2018	Crisiidae indet.	T. M. Benjaminsen	Bergen	60.38874N 5.29863E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83861	PolyPort	11.04.2018	Electra pilosa	T. M. Benjaminsen	Bergen	60.38874N 5.29863E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81293	PolyPort	11.09.2018	Candidae indet.	T. M. Benjaminsen	Bergen	60.38874N 5.29863E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83855	PolyPort	13.09.2018	Electra pilosa	T. M. Benjaminsen	Espeland area	60.25660N 5.23780E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81325	PolyPort	13.09.2018	Candidae indet., Scruparia sp.	T. M. Benjaminsen	Espeland area	60.25660N 5.23780E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81326	PolyPort	13.09.2018	Cradoscrupocellaria cf. Reptans	T. M. Benjaminsen	Espeland area	60.25664N 5.23898E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83853	PolyPort	13.09.2018	Juxtacribrilina mutabilis, Membranipora membranacea, Candidae indet.	T. M. Benjaminsen	Espeland area	60.2699N 5.2215E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83854	PolyPort	13.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Espeland area	60.2699N 5.2215E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81327	PolyPort	13.09.2018	Scruparia ambigua, Membranipora membranacea	T. M. Benjaminsen	Espeland area	60.2699N 5.2215E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83837	PolyPort	14.09.2018	Juxtacribrilina mutabilis	T. M. Benjaminsen	Stavanger	58.95762N 5.74449E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83838	PolyPort	14.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.95762N 5.74449E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83839	PolyPort	14.09.2018	Candidae indet., Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.95762N 5.74449E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83840	PolyPort	14.09.2018	Candidae indet.	T. M. Benjaminsen	Stavanger	58.95762N 5.74449E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81309	PolyPort	14.09.2018	Bugulina cf. simplex	T. M. Benjaminsen	Stavanger	58.95762N 5.74449E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83817	PolyPort	14.09.2022	Crisularia plumosa	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83818	PolyPort	14.09.2022	Juxtacribrilina cf. mutabilis, Aetea sp., Tubulipora sp.	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83819	PolyPort	14.09.2022	Tubulipora sp., Aetea sp., Scruparia ambigua	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83820	PolyPort	14.09.2022	Aetea sp.	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby

NTNU-VM 83821	PolyPort	14.09.2022	Membranipora membranacea	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83822	PolyPort	14.09.2022	Membranipora membranacea, Candidae indet.	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83823	PolyPort	14.09.2022	Juxtacribrilina cf. mutabilis	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 81310	PolyPort	14.09.2022	Candidae indet.	T. M. Benjaminsen	Stavanger	58.95756N 5.76065E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 81311	PolyPort	14.09.2022	Cryptosula pallasiana, Crisia sp.	T. M. Benjaminsen	Stavanger	58.95835N 5.76056E		Torkild Bakken, Tuva Bongard Munkeby
NTNU-VM 83830	PolyPort	15.09.2018	Tubulipora sp., Aetea sp., Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83831	PolyPort	15.09.2018	Bugula sp.	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83832	PolyPort	15.09.2018	Crisularia plumosa	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83833	PolyPort	15.09.2018	Hippoprina sp.	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83834	PolyPort	15.09.2018	Schizoporella japonica	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83835	PolyPort	15.09.2018	Juxtacribrilina mutabilis	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83836	PolyPort	15.09.2018	Tubulipora sp.	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81312	PolyPort	15.09.2018	Membranipora membranacea	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81313	PolyPort	15.09.2018	Crisularia cf. plumosa	T. M. Benjaminsen	Stavanger	58.96452N 5.76789E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83827	PolyPort	15.09.2018	Electra pilosa	T. M. Benjaminsen	Stavanger	58.97077N 5.75497E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83828	PolyPort	15.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.97077N 5.75497E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83829	PolyPort	15.09.2018	Candidae indet.	T. M. Benjaminsen	Stavanger	58.97077N 5.75497E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81314	PolyPort	15.09.2018	Membranipora membranacea. Ctenostomatida indet	T. M. Benjaminsen	Stavanger	58.97077N 5.75497E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81315	PolyPort	15.09.2018	Membranipora membranacea	T. M. Benjaminsen	Stavanger	58.97077N 5.75497E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81316	PolyPort	15.09.2018	Membranipora membranacea	T. M. Benjaminsen	Stavanger	58.97191N 5.74524E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83841	PolyPort	15.09.2018	Crisidia cornuta, Scruparia sp.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83842	PolyPort	15.09.2018	Aetea sp.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83843	PolyPort	15.09.2018	Crisidae indet., Scruparia sp.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83844	PolyPort	15.09.2018	Cheilostomatida indet.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83845	PolyPort	15.09.2018	Scruparia sp.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81317	PolyPort	15.09.2018	Cryptosula pallasiana, Scruparia sp6	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby

NTNU-VM 81318	PolyPort	15.09.2018	Crisidae indet.	T. M. Benjaminsen	Stavanger	58.97287N 5.74036E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83810	PolyPort	15.09.2018	Juxtacribrilina cf. mutabilis, Aetea sp.	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83811	PolyPort	15.09.2018	Juxtacribrilina cf. mutabilis	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83812	PolyPort	15.09.2018	Scruparia sp, Aetea sp., Candidae indet.	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83813	PolyPort	15.09.2018	Aetea sp, Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83814	PolyPort	15.09.2018	Membranipora membranacea	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83815	PolyPort	15.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83816	PolyPort	15.09.2018	Tubulipora sp.	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81319	PolyPort	15.09.2018	Cradoscrupocellaria cf. Reptans, Scruparia sp.	T. M. Benjaminsen	Stavanger	58.97432N 5.73318E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81320	PolyPort	15.09.2018	Bryozoa	T. M. Benjaminsen	Stavanger	58.97055N 5.73025E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81321	PolyPort	15.09.2018	Reteporella sp.	T. M. Benjaminsen	Stavanger	58.97547N 5.73998E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83801	PolyPort	15.09.2018	Electra pilosa	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83802	PolyPort	15.09.2018	Cradoscrupocellaria cf. Reptans, Scruparia sp.	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83803	PolyPort	15.09.2018	Schizoporella sp.	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83804	PolyPort	15.09.2018	Amathia sp., Aetea sp.	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83805	PolyPort	15.09.2018	Scruparia sp, Aetea sp.	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81322	PolyPort	15.09.2018	Cryptosula pallasiana, Membranipora membranacea, Crisia sp.	T. M. Benjaminsen	Stavanger	58.98976N 5.72500E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83806	PolyPort	15.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83807	PolyPort	15.09.2018	Schizoporella cf. japonica	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83808	PolyPort	15.09.2018	Juxtacribrilina cf. mutabilis	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83809	PolyPort	15.09.2018	Candidae indet.	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81323	PolyPort	15.09.2018	Electra pilosa, Cradoscrupocellaria sp.	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81324	PolyPort	15.09.2018	Candidae indet.	T. M. Benjaminsen	Stavanger	58.98837N 5.74212E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81287	PolyPort	17.09.2018	Conopeum reticulum	T. M. Benjaminsen	Sandefjord	59.10248N 10.23797E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81288	PolyPort	17.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Sandefjord	59.11402N 10.23026E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby

NTNU-VM 83856	PolyPort	17.09.2018	Conopeum sp.	T. M. Benjaminsen	Sandefjord	59.12690N 10.24042E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81289	PolyPort	17.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Sandefjord	59.12690N 10.24042E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81290	PolyPort	17.09.2018	Cryptosula pallasiana	T. M. Benjaminsen	Sandefjord	59.12484N 10.22272E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81291	PolyPort	18.09.2018	Conopeum cf. reticulum	T. M. Benjaminsen	Oslo	59.90725N 10.72429E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 81292	PolyPort	20.09.2018	Conopeum cf. reticulum	T. M. Benjaminsen	Oslo	59.90362N 10.75418E		Torkild Bakken, Maria Capa, Tuva Bongard Munkeby
NTNU-VM 83876	PolyPort	22.08.2019	Candidae indet., Amathia sp.	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83877	PolyPort	22.08.2019	Electra pilosa	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81817	PolyPort	22.08.2019	Electra pilosa, Candidae indet	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81818	PolyPort	22.08.2019	Candidae indet., Scruparia sp.	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83880	PolyPort	22.08.2019	Aetea sp	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83881	PolyPort	23.08.2019	Stoloniferina sp.	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83882	PolyPort	24.08.2019	Membranipora membranacea	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83883	PolyPort	25.08.2019	Scruparia sp, Candidae indet.	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83884	PolyPort	26.08.2019	Electra pilosa	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83885	PolyPort	27.08.2019	Electra pilosa, Candidae indet, Scruparia sp.	T. M. Benjaminsen	Grimstad	58.323348N 08.580955E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81346	PolyPort	23.08.2019	Einhornia crustulenta	T. M. Benjaminsen	Kristiansand	58.14928N 08.03718E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83850	PolyPort	23.08.2019	Aetea sp., Cryptosula pallasiana	T. M. Benjaminsen	Kristiansand	58.15176N 08.03516E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83851	PolyPort	23.08.2019	Stoloniferina sp.	T. M. Benjaminsen	Kristiansand	58.15176N 08.03516E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83852	PolyPort	23.08.2019	Crisiidae indet.	T. M. Benjaminsen	Kristiansand	58.15176N 08.03516E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81345	PolyPort	23.08.2019	Candidae indet.	T. M. Benjaminsen	Kristiansand	58.15176N 08.03516E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81347	PolyPort	23.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Kristiansand	58.15176N 08.03516E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81348	PolyPort	23.08.2019	Einhornia crustulenta	T. M. Benjaminsen	Kristiansand	58.150243N 08.033097E		Luis Martell, Eivind Oug
NTNU-VM 83848	PolyPort	23.08.2019	Juxtacribrilina mutabilis	T. M. Benjaminsen	Kristiansand	58.14232N 08.00309E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81349	PolyPort	23.08.2019	Schizoporella cf. Japonica	T. M. Benjaminsen	Kristiansand	58.14232N 08.00309E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81350	PolyPort	23.08.2019	Juxtacribrilina mutabilis	T. M. Benjaminsen	Kristiansand	58.14439N 08.00783E		Marte Svorkmo Espelien, Torkild Bakken

NTNU-VM 81351	PolyPort	23.08.2019	Einhornia crustulenta, Ctenostomatida indet.	T. M. Benjaminsen	Kristiansand	58.14398N 08.00495E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81352	PolyPort	23.08.2019	Electra pilosa	T. M. Benjaminsen	Kristiansand	58.143084N 08.003317E		Luis Martell, Eivind Oug
NTNU-VM 83849	PolyPort	23.08.2019	Candidae indet., Electra pilosa	T. M. Benjaminsen	Kristiansand	58.14259N 07.99152E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81353	PolyPort	23.08.2019	Electra pilosa, Cryptosula pallasiana	T. M. Benjaminsen	Kristiansand	58.14259N 07.99152E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83846	PolyPort	23.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Kristiansand	58.14312N 07.99170E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83847	PolyPort	23.08.2019	Alcyonidium gelatinosum	T. M. Benjaminsen	Kristiansand	58.14312N 07.99170E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81354	PolyPort	23.08.2019	Electra pilosa	T. M. Benjaminsen	Kristiansand	58.14312N 07.99170E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81355	PolyPort	23.08.2019	Juxtacribrilina mutabilis	T. M. Benjaminsen	Kristiansand	58.12539N 07.97330E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81356	PolyPort	23.08.2019	Electra pilosa	T. M. Benjaminsen	Kristiansand	58.12532N 07.97182E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81357	PolyPort	23.08.2019	Aetea sp	T. M. Benjaminsen	Kristiansand	58.12533N 07.97237E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81822	PolyPort	25.08.2019	Electra pilosa	T. M. Benjaminsen	Grimstad	58.34061N 08.59692E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81886	PolyPort	25.08.2019	Scruparia ambigua, Candidae indet., Ctenostomatida indet	T. M. Benjaminsen	Grimstad	58.34061N 08.59692E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81887	PolyPort	25.08.2019	Electra pilosa, Scruparia sp.	T. M. Benjaminsen	Grimstad	58.34061N 08.59692E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81888	PolyPort	25.08.2019	Candidae indet.	T. M. Benjaminsen	Grimstad	58.34061N 08.59692E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83862	PolyPort	25.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Grimstad	58.33904N 08.59454E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81823	PolyPort	25.08.2019	Candidae indet.	T. M. Benjaminsen	Grimstad	58.33904N 08.59454E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83824	PolyPort	25.08.2019	Electra pilosa, Membranipora membranacea	T. M. Benjaminsen	Lillesand	58.24725N 08.37979E		Torkild Bakken, Marte Svorkmo Espelien, Luis Martell, Eivind Oug
NTNU-VM 83825	PolyPort	26.08.2019	Schizoporella sp.	T. M. Benjaminsen	Lillesand	58.24725N 08.37979E		Torkild Bakken, Marte Svorkmo Espelien, Luis Martell, Eivind Oug
NTNU-VM 83826	PolyPort	27.08.2019	Electra pilosa	T. M. Benjaminsen	Lillesand	58.24725N 08.37979E		Torkild Bakken, Marte Svorkmo Espelien, Luis Martell, Eivind Oug
NTNU-VM 81307	PolyPort	25.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Lillesand	58.24725N 08.37979E		Torkild Bakken, Marte Svorkmo Espelien, Luis Martell, Eivind Oug
NTNU-VM 81335	PolyPort	26.08.2019	Conopeum sp.	T. M. Benjaminsen	Brevik	59.06332N 09.69956E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81334	PolyPort	26.08.2019	Plagioecia patina	T. M. Benjaminsen	Brevik	59.06113N 09.69318E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81336	PolyPort	26.08.2019	Conopeum sp.	T. M. Benjaminsen	Brevik	59.0635N 09.70062E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81337	PolyPort	26.08.2019	Conopeum sp.	T. M. Benjaminsen	Brevik	59.06170N 09.69399E		Marte Svorkmo Espelien, Torkild Bakken

NTNU-VM 81338	PolyPort	26.08.2019	Plagioecia patina	T. M. Benjaminsen	Brevik	59.05279N 09.70822E		Luis Martell, Eivind Oug
NTNU-VM 83857	PolyPort	26.08.2019	Plagiopecia patina	T. M. Benjaminsen	Brevik	59.05386N 09.68324E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81339	PolyPort	26.08.2019	Juxtacribrilina mutabilis, Crisiidae indet.	T. M. Benjaminsen	Brevik	59.05386N 09.68324E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81341	PolyPort	26.08.2019	Conopeum sp.	T. M. Benjaminsen	Brevik	59.04520N 09.70287E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81342	PolyPort	26.08.2019	Membranipora membranacea	T. M. Benjaminsen	Brevik	59.04660N 09.70124E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83858	PolyPort	26.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Brevik	59.04704N 09.69913E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 81340	PolyPort	26.08.2019	Electra pilosa	T. M. Benjaminsen	Brevik	59.04704N 09.69913E		Marte Svorkmo Espelien, Torkild Bakken
NTNU-VM 83863	PolyPort	27.08.2019	Electra pilosa	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83864	PolyPort	27.08.2019	Electra pilosa, Membranipora membranacea	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83865	PolyPort	27.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83866	PolyPort	27.08.2019	Ctenostomatida indet., Cryptosula pallasiana	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83867	PolyPort	27.08.2019	Scruparia ambigua, Aetea sp.	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81824	PolyPort	27.08.2019	Candidae indet.	T. M. Benjaminsen	Homborsund	58.26484N 08.51268E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83868	PolyPort	28.08.2019	Membranipora membranacea	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83869	PolyPort	28.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83870	PolyPort	28.08.2019	Aetea sp.	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83871	PolyPort	28.08.2019	Candidae indet.	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83872	PolyPort	28.08.2019	Electra pilosa	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83873	PolyPort	28.08.2019	Cryptosula pallasiana, Schizoporella cf. Japonica	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83874	PolyPort	28.08.2019	Schizoporella cf. Unicornis	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83875	PolyPort	28.08.2019	Schizoporella sp.	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81819	PolyPort	28.08.2019	Juxtacribrilina mutabilis	T. M. Benjaminsen	Risør	58.72174N 09.23818E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81820	PolyPort	28.08.2019	Electra pilosa	T. M. Benjaminsen	Risør	58.71903N 09.24009E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug

NTNU-VM 83878	PolyPort	28.08.2019	Membranipora membranacea	T. M. Benjaminsen	Risør	58.71903N 09.24009E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 83879	PolyPort	28.08.2019	Cryptosula pallasiana	T. M. Benjaminsen	Risør	58.71903N 09.24009E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
NTNU-VM 81821	PolyPort	28.08.2019	Cryptosula pallasiana, Electra pilosa, Ctenostomatida indet	T. M. Benjaminsen	Tvedestrand	58.62487N 08.95345E		Marte Svorkmo Espelien, Torkild Bakken, Luis Martell, Eivind Oug
ZMBN 140127	HABFA	14.02.2022	Fenestrulina malusii	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140129	HABFA	14.02.2022	Aetea sp.	Ramsfjell, Mali Hamre; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140130	HABFA	14.02.2022	Scrupocellaria reptans	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140131	HABFA	14.02.2022	Juxtacribrilina mutabilis	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140133	HABFA	14.02.2022	Cryptosula pallasiana	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140134	HABFA	14.02.2022	Schizoporella japonica	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140135	HABFA	14.02.2022	Scrupocellaria cf. Reptans	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140136	HABFA	14.02.2022	Membranipora membranacea	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140137	HABFA	14.02.2022	Electra pilosa	Kuklinski, Piotr; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140143	HABFA	14.02.2022	Hippoporina sp.	Kuklinski, Piotr; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140146	HABFA	14.02.2022	Hippoporina sp.	Benjaminsen, Tine; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 147737	HABFA	14.02.2022	Schizoporella japonica	Ramsfjell, Mali Hamre; 2022	Espegrend	60.2698N 5.22164E	sublitt	Tom Alvestad, Tine M. Benjaminsen, Tiril Sørlie
ZMBN 140132	HABFA	14.02.2022	Cribrilina mutabulis	TMB	Hjellestad marina	60.2558N 5.23841E	sublitt	Tom Alvestad, Tine M. Benjaminsen
ZMBN 140139	HABFA	14.02.2022	Tubulipora sp.	TMB	Hjellestad marina	60.2558N 5.23841E	sublitt	Tom Alvestad, Tine M. Benjaminsen
ZMBN 140138	HABFA	15.02.2022	Cellepora pumicosa	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 140140	HABFA	15.02.2022	Crisia sp.	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 140141	HABFA	15.02.2022	Tubulipora sp.	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 140142	HABFA	15.02.2022	Turbicellepora avicularis	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 140144	HABFA	15.02.2022	Parasmittina trispinosa	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn

ZMBN 146084	HABFA	15.02.2022	Microporella ciliata sensu Hayward & Ryland	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146085	HABFA	15.02.2022	Celleporina tubulosa	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146107	HABFA	15.02.2022	Celleporella hyalina	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146108	HABFA	15.02.2022	Microporella ciliata sensu Hayward & Ryland	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146109	HABFA	15.02.2022	Electra pilosa	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146110	HABFA	15.02.2022	Juxtacribrilina annulata	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146111	HABFA	15.02.2022	Celleporeall hyalina	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146112	HABFA	15.02.2022	Tubulipora sp	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146114	HABFA	15.02.2022	Microporella ciliata sensu Hayward & Ryland	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146115	HABFA	15.02.2022	Celleporella hyalina	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146116	HABFA	15.02.2022	Patinella sp.	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146117	HABFA	15.02.2022	Electra pilosa	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146118	HABFA	15.02.2022	Turbicellepora avicularis	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146119	HABFA	15.02.2022	Schizomavella (Schizomavella) linearis	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146121	HABFA	15.02.2022	Juxtacribrilina annulata	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146122	HABFA	15.02.2022	Callopora dumerilii	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146123	HABFA	15.02.2022	Fenestrulina malusii	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146124	HABFA	15.02.2022	Escharella immersa	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146125	HABFA	15.02.2022	Cyclostomata indet	Piotr Kuklinski, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146127	HABFA	15.02.2022	Celleporella hyalina	Joanne Porter, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146135	HABFA	15.02.2022	Microporella sp.	Joanne Porter, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 146136	HABFA	15.02.2022	Juxtacribrilina annulata	Joanne Porter, 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn

ZMBN 147742	HABFA	15.02.2022	Turbicellepora avicularis	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 147755	HABFA	15.02.2022	Parasmittina trispinosa	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn
ZMBN 147756	HABFA	15.02.2022	Porella concinna	Ramsfjell, Mali Hamre; 2022	Bukken	60.2367N 5.20512E	14-23	Mali Ramsfjell, Tine M. Benjaminsen, Katrine Kongshavn

NTNU

Norwegian University of
Science and Technology