OLICH: A reference library of DNA barcodes for Nordic lichens

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Abstract

Background

DNA barcodes are increasingly being used for species identification amongst the lichenised fungi. This paper presents a dataset aiming to provide an authoritative DNA barcode sequence library for a wide array of Nordic lichens.

New information

We present 1324 DNA barcode sequences (nrITS) for 507 species in 175 genera and 25 orders. Thirty-eight species are new to GenBank and, for 25 additional species, ITS sequences are here presented for the first time. The dataset covers 20–21% of the Nordic lichenised species. Barcode gap analyses are given and discussed for the three genera Cladonia, Ramalina and Umbilicaria. The new combination Bryobilimbia fissuriseda (Poelt) Timdal, Marthinsen & Rui is proposed for Mycobilimbia fissuriseda and Nordic material of the species, currently referred to as Pseudocyphellaria crocata and Psoroma tenue ssp. boreale, are shown to belong in Pseudocyphellaria citrina and Psoroma cinnamomeum, respectively.
Keywords

DNA barcoding, ITS, Lichenised fungi, Norway, Taxonomy

Introduction

Lichens are fungi living in mutualistic symbiosis with green algae and/or cyanobacteria. They are highly polyphyletic and 20–30 independent lichenisation events may have occurred during the evolution of higher Fungi (Schoch et al. 2009, Lücking et al. 2017a). The lichenised fungi currently consists of more than 19,000 species, i.e. about 17% of all known fungal species and 27% of all known ascomycete species (Lücking et al. 2017a). They occur globally in all major terrestrial ecosystems, especially on trees, soil and rock. Although a lichen thallus consists of a symbiotic association between a fungal exhabitant, the mycobiont and one or more photosynthetic algal and/or cyanobacterial inhabitants, the photobionts, the taxonomy and nomenclature follow that of the mycobiont. A lichen thallus may house additional fungi, i.e. parasites, parasymbionts and endophytes (Hawksworth 1982, Richardson 1999, Spribille et al. 2016), making a lichen thallus a complex symbiotic assemblage.

Identifying lichenised fungi has traditionally been based on morphological, anatomical and chemical characters, but DNA-based identification is now increasingly being used. In 2012, the internal transcribed spacer of nuclear ribosomal DNA (ITS) was recommended as the primary fungal DNA barcode marker by the International Fungal Barcoding Consortium (Xu 2016), following studies on its suitability by for example Schoch et al. (2012). For lichenised fungi, studies reporting successful use of the ITS marker for species delimitations include Kelly et al. (2011), Zheng et al. (2011), Parnmen et al. (2013), Leavitt et al. (2014), Magain and Serusiaux (2015) and Divakar et al. (2016). Pino-Bodas et al. (2013), however, found ITS often failing for species delimitations in Cladonia and investigated alternative markers.

In this paper, we present a DNA barcode dataset for Nordic lichens, including 1324 records, comprising 507 species in 175 genera and 25 different orders.

General description

Purpose: This dataset aims to provide an authoritative DNA barcode sequences library for a wide array of Nordic lichens. The library should facilitate DNA-based identification of species for both traditional molecular studies and DNA-metabarcoding studies and should also be a resource for biosystematic research on Nordic lichens.

Additional information: Eighty sequences have been published previously, but are included here as they were produced under the OLiCH project, i.e. GenBank IDs KT800002–07 (Westberg et al. 2015), KU687445–60 (McCune et al. 2016), KU873926–32
(Timdal et al. 2016), KY682961 (Pykälä et al. 2018), 38 sequences within the series MG838156–201 (Kistenich et al. 2018), MG968256–61 (Haugan and Timdal 2018) and MK567159–64 (Haugan and Timdal 2019). In addition, 151 sequences (KY266831–981) have been submitted to GenBank previously for an unpublished project.

**Results:** Thirty-eight species are new to GenBank: *Arthonia phaeobaea*, *Arthopyrenia salicis*, *Bactrospora corticola*, *Baemyces carneus*, *Buellia arnoldii*, *B. dives*, *Candelariella arctica*, *Cladonia cyanipes*, *Coccotrema citrinescens*, *Eopyrenula leucoplaca*, *Epilichen glauconigellus*, *E. scabrosus*, *Gyalecta foveolaris*, *Lecanora atrosulphurea*, *L. leptacina*, *Ochrolechia alaskana*, *O. alboflavescens*, *O. gowardii*, *O. mahlensis*, *Otrihnea moriopsis*, *Phaeophyscia kairamoi*, *Pilophorus dovrensis*, *Pseudocyphellaria norvegica*, *Pyrenula occidentalis*, *Ramalina cuspidata*, *Rhizocarpon badioatrum*, *R. bolanderi*, *R. chioneum*, *R. jemtlandicum*, *R. leptolepis*, *R. rittokense*, *R. santessonii*, *R. subgeminatum*, *Rinodina balanina*, *R. disjuncta*, *R. roboris*, *Stereocaulon capitellatum* and *S. symphyceilum*.

Twenty-five additional species are previously represented in GenBank, but not with ITS sequences: *Arthonia didyma*, *Bryobilimbia fissuriseda*, *Buellia epigaea*, *Callome multipartita*, *Dendrographa latebrarum*, *Fuscidea mollis*, *Gyalecta flotowii*, *G. friesii*, *G. geoica*, *Gyrographa gyrocarpa*, *Halecania alpivaga*, *Koerberiella wimmeriana*, *Opegrapha vermicellifera*, *Pertusaria aspergilla*, *P. carneopallida*, *Phlyctis agelaea*, *Placynthiella oligotropha*, *Psoronactis dilleniana*, *Pyrenula laevigata*, *Ramboldia elabens*, *Sagiolechia protuberans*, *Stereocaulon grande*, *Thelotrema macrosporum*, *Tremolecia atrata* and *Varicellaria lactea*.

**Project description**

**Title:** The name OLICH refers to “contributions from the Oslo lichen herbarium”.

**Personnel:** Gunnhild Marthinsen (project coordinator), Siri Rui (project engineer), Einar Timdal (taxonomic supervisor), all affiliated to the Natural History Museum, University of Oslo.

**Study area description:** The Nordic countries, including Svalbard: Norway, mainland (97.0% of the specimens), Sweden (2.0%), Finland (0.5%), Norway, Svalbard (0.5%), Fig. 1.

**Funding:** This project is funded by the Norwegian Research Council (RCN 226134) through the Norwegian Barcode of Life project (NorBOL). In addition, the Norwegian Species Information Centre (Artsdatabanken) has funded four projects on lichens under the Norwegian Taxonomy Initiative from which material has been collected and/or sampled (project numbers 70184216, 70184227, 70184233, and 70184237).
Sampling methods

**Sampling description:** The material was partly freshly collected specimens from the field and partly previously curated specimens in university herbaria. The distribution of specimen age at sequencing is given in Fig. 2. The specimens were initially determined by experts based on morphology and secondary chemistry and the identifications were re-examined at the quality control after sequence acquisition. All collected material were, after sampling, deposited in university herbaria and the entire material is housed in BG (2.1%), H (0.1%), O (94.9%), SAV (0.2%), TRH (1.7%) and TROM (1.1%) (abbreviated according to *Index Herbariorum*; [http://sweetgum.nybg.org/science/ih](http://sweetgum.nybg.org/science/ih)).

![Figure 1. Distribution of the OLICH records](image1)

![Figure 2. Distribution of specimen age (years after collecting) at sequencing in the OLICH dataset](image2)
Thin-layer chromatography (TLC) was performed for identification of secondary compounds on selected specimens in accordance with the methods of Culberson (1972), as modified by Menlove (1974) and Culberson and Johnson (1982). Solvent system B’ was used for routine examination, A and C for additional confirmation.

Tissue of thallus or preferably apothecia (about 3 mm³) was assembled in 96 well plates obtained from the Canadian Centre for DNA Barcoding (CCDB; http://ccdb.ca). One well was left empty to serve as negative control. The freshly collected material was either sampled in the field or at a field station. In the field, the specimen was first photographed, then tissue was removed with a flame-decontaminated forceps and placed in the well and finally the specimen was collected. Specimens requiring more controlled handling were photographed and sampled either with forceps or scalpel under a binocular lens at a field station. Wells containing fresh material were dried for several days with lids open in a drying chamber containing silica gel. Herbarium material was sampled at the housing institutions under binocular lenses.

Field data was stored on tablets and GPSs. Tissue sampling data and photography data were transferred directly to standard BOLD spreadsheets, whereas the collection data passed through herbarium databases for obtaining institution storing, voucher ID (= sample ID), uniform nomenclature and taxonomical hierarchy and contact information. Material sampled in herbaria used a similar pipeline, although simpler, as collection data was already available.

The plates were sent to CCDB for DNA extraction (following Ivanova et al. 2011) and sequencing of the ITS region (following Kuzmina and Ivanova 2011). Primers used were ITS1-F or ITS5 (forward) and ITS4 (reverse) (Gardes and Bruns 1993, White et al. 1990). Trace files and sequences were uploaded to BOLD (Ratnasingham and Hebert 2007). The sequences were edited at CCDB, but occasionally inspected and re-edited at OLICH.

**Quality control:** All OLICH sequences were subjected to a local BLASTn search against a database consisting of all lichen ITS sequences in GenBank (downloaded 26-06-2018) and all unpublished lichen ITS sequences were produced at various projects at our own institution, including the OLICH dataset. We inspected automatically generated distance-based neighbour-joining trees for all genera represented in the OLICH dataset, i.e. we merged all OLICH sequences with all GenBank ITS sequences from the same genus before running ClustalW2 (http://www.clustal.org/clustal2) in batch mode (one run for each genus) and saving the trees. For selected cases (Figs. 5–15), phylogenetic analyses were performed through the following pipeline: selecting relevant additional sequences for comparison from the GenBank download; aligning the dataset using the online version of MAFFT (https://mafft.cbrc.jp/alignment/server); trimming ends and manually editing the alignment using BioEdit 7.1.3.0 (Hall 1999); analysing the alignment by the maximum likelihood method using RAxML v. 8.2.10 (Stamatakis 2014) by applying the “ML + rapid bootstrap” method with 100 bootstrap repeats and the GTRGAMMA substitution model; and editing the best-scoring tree using TreeGraph2 (Stöver and Müller 2010).
To further check that the sequences and species determinations were correct and also to check whether species delimitation, based on traditional characters, coincides with ITS species delimitation, we performed barcode gap analyses. The three genera in our dataset with most sampled species were chosen for these analyses; *Cladonia*, *Ramalina* and *Umbilicaria*. Sequences were aligned separately for each genus using the ClustalW algorithm implemented in MEGA7 (Kumar et al. 2016), with additional manual editing. Pairwise genetic distances between all specimens within each of the three genera were calculated in MEGA7, using the K2P substitution model. The distances were summarised in a bar plot, based on a histogram of all pairwise distances. For each species pair within the genera, we plotted the maximum intraspecific distance against the minimum distance to nearest neighbour-species.

**Geographic coverage**

**Description:** The Nordic countries, including Svalbard (Fig. 1).

**Coordinates:** 58.02°N and 78.94°N Latitude; 5.06°E and 31.08°E Longitude.

**Taxonomic coverage**

**Description:** The OLICh dataset comprises 1324 records of 507 species belonging to 25 orders, 8 classes and 2 phyla of fungi (Table 1). The Nordic lichen flora comprises some 2400–2500 lichenised species (2387 are listed in Santesson et al. (2004)), i.e. the dataset comprises about 20–21% of the currently known Nordic species. Several taxonomic groups are still poorly understood, however, making the production of authoritative DNA-barcodes for many species premature due to uncertain taxonomy and/or lack of fresh material. The dataset is hence biased towards the more well-known groups, mainly the macrolichens in the orders Lecanorales (233 spp.), Peltigerales (62 spp.) and Caliciales (37 spp.) of the class Lecanoromycetes (Ascomycota). The taxonomy and nomenclature follows Nordin et al. (2019) unless commented on under Observations below.

| Species              | Order           | Voucher           | Sample ID | Process ID | GenBank ID | Chemistry |
|----------------------|-----------------|-------------------|-----------|------------|------------|-----------|
| *Acarospora glaucocarpa* | Acarosporales | NO, Nord-      | O-L-201295 | OLICH3852-17 | MK811746   |           |
|                      |                 | Trøndelag, 2015, R. Haugan |           |            |            |           |
| Species                  | Order          | Voucher               | Sample ID   | Process ID   | GenBank ID | Chemistry |
|-------------------------|----------------|-----------------------|-------------|--------------|------------|-----------|
| Acarospora molybdina    | Acarosporales  | NO, Finnmark, 2014, E. Timdal | O-L-195556  | OLICH1534-14 | KY266941   |           |
| Acarospora wahlenbergii | Acarosporales  | NO, Hedmark, 2013, E. Timdal | O-L-184511  | OLICH737-13  | MK811773   |           |
| Acarospora wahlenbergii | Acarosporales  | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184363  | OLICH742-13  | MK812641   |           |
| Acarospora wahlenbergii | Acarosporales  | NO, Telemark, 2013, E. Timdal | O-L-184419  | OLICH870-13  | MK811926   |           |
| Acolium inquinans       | Caliciales     | NO, Nordland, 2012, J.T. Klepsland | O-L-186246  | OLICH2077-15 | MK812481   |           |
| Acolium inquinans       | Caliciales     | NO, Buskerud, 2012, T.H. Hofton | O-L-194494  | OLICH2080-15 | MK811701   |           |
| Acolium inquinans       | Caliciales     | NO, Aust-Agder, 2014, J.T. Klepsland | O-L-200169  | OLICH3168-16 | MK812233   |           |
| Acolium inquinans       | Caliciales     | NO, Hedmark, 2014, R. Haugan | O-L-207991  | OLICH3827-17 | MK811747   |           |
| Alectoria nigricans     | Lecanorales    | NO, Troms, 2014, E. Timdal | O-L-195780  | OLICH1652-14 | MK812557   |           |
| Alectoria nigricans     | Lecanorales    | NO, Finnmark, 2014, M. Westberg | O-L-195858  | OLICH1703-14 | KY266967   |           |
| Alectoria nigricans     | Lecanorales    | NO, Finnmark, 2014, E. Timdal | O-L-195886  | OLICH1731-14 | KY266922   |           |
| Alectoria nigricans     | Lecanorales    | NO, Finnmark, 2014, H. Holien | O-L-195950  | OLICH1795-14 | KY266831   |           |
| Species               | Order     | Voucher | Sample ID | Process ID | GenBank ID | Chemistry |
|----------------------|-----------|---------|-----------|------------|------------|-----------|
| *Alectoria nigricans*| Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196314 | OLICH2244-15 | MK812235 |
|                      |           |         |           |            |            |           |
|                      |           |         | O-L-200895 | OLICH2548-16 | MK812358 |
| *Alectoria ochroleuca*| Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195746 | OLICH1618-14 | KY266936 |
|                      |           |         | O-L-195883 | OLICH1728-14 | KY266959 |
| *Alectoria ochroleuca*| Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195823 | OLICH2195-15 | MK811939 |
|                      |           |         | O-L-200894 | OLICH2547-16 | MK812226 |
| *Alectoria ochroleuca*| Lecanorales | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-195823 | OLICH2195-15 | MK811939 |
| *Alectoria ochroleuca*| Lecanorales | NO, Oppland, 2012, K.A. Lye | O-L-206884 | OLICH4129-17 | MK812278 |
| *Alectoria sarmentosa*| Lecanorales | NO, Nord-Trøndelag, 2012, J.T. Klepsland | O-L-186255 | OLICH1441-14 | MK812505 |
|                      |           |         | O-L-186870 | OLICH1452-14 | MK812223 |
| *Alectoria sarmentosa*| Lecanorales | NO, Østfold, 2013, B.P. Løfall & O. Wergeland Krog | O-L-187364 | OLICH1460-14 | MK812403 |
|                      |           |         | O-L-193185 | OLICH1478-14 | MK812717 |
| Species                  | Order       | Voucher                     | Sample ID  | Process ID     | GenBank ID | Chemistry |
|--------------------------|-------------|-----------------------------|------------|----------------|------------|-----------|
| *Alectoria sarmentosa*   | Lecanorales | NO, Sør-Trøndelag, 2014, S. Vatne | O-L-200758 | OLICH3273-16   | MK812509   |           |
| *Allantoparmelia alpicola* | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195748 | OLICH1620-14   | KY266974   |           |
| *Allantoparmelia alpicola* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195850 | OLICH1695-14   | KY266926   |           |
| *Allantoparmelia alpicola* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195899 | OLICH1744-14   | KY266946   |           |
| *Allantoparmelia alpicola* | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196324 | OLICH2254-15   | MK811991   |           |
| *Allantoparmelia alpicola* | Lecanorales | NO, Oppland, 2015, E. Timdal | O-L-201391 | OLICH1473-17   | MK811876   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Aust-Agder, 2012, J.T. Klepsland | O-L-186030 | OLICH1419-14   | MK812701   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Hedmark, 2011, T.H. Hofton | O-L-194359 | OLICH1483-14   | MK812099   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Finnmark, 2014, E. Timdal | O-L-195591 | OLICH1532-14   | MK812249   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Finnmark, 2014, G. Thor  | O-L-195736 | OLICH1608-14   | KY266912   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Akershus, 2014, E. Timdal | O-L-199982 | OLICH1956-15   | MK812295   |           |
| *Anaptychia ciliaris*    | Caliciales  | NO, Oslo, 2014, E. Timdal    | O-L-198929 | OLICH2482-16   | MK812296   |           |
| *Anaptychia runcinata*   | Caliciales  | NO, Finnmark, 2014, E. Timdal | O-L-195767 | OLICH1639-14   | MK812680   |           |
| Species                  | Order       | Voucher                           | Sample ID   | Process ID  | GenBank ID    | Chemistry                                |
|-------------------------|-------------|-----------------------------------|-------------|-------------|---------------|------------------------------------------|
| *Anaptychia runcinata*  | Caliciales  | NO, Sør-Trøndelag, 2014, R. Haugan| O-L-196019  | OLICH1864-14| MK811742      |                                          |
| *Anaptychia runcinata*  | Caliciales  | NO, Østfold, 2016, S. Rui & E. Timdal| O-L-208017  | OLICH4189-17| MK811645      |                                          |
| *Arctocetraria andrejevii* | Lecanorales | NO, Finnmark, 2012, H. Henriksen  | O-L-180951  | OLICH869-13 | MK811992      | norrangiformic acid (minor), rangiformic acid (major) |
| *Arctoparmelia centrifuga* | Lecanorales | NO, Troms, 2014, R. Haugan       | O-L-198774  | OLICH2399-16| MK812567      |                                          |
| *Arctoparmelia centrifuga* | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200879  | OLICH2536-16| MK812513      |                                          |
| *Arctoparmelia incurva* | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184727  | OLICH942-13 | MK812611      |                                          |
| *Arctoparmelia incurva* | Lecanorales | NO, Finnmark, 2014, T. Tønsberg  | O-L-195717  | OLICH1589-14| KY266852      |                                          |
| *Arthopyrenia salicis*  | Pleosporales| NO, Nord-Trøndelag, 2016, J.T. Klepsland | O-L-198129  | OLICH3187-16| MK812215      |                                          |
| *Arthopyrenia salicis*  | Pleosporales| NO, Nord-Trøndelag, 2016, J.T. Klepsland | O-L-206752  | OLICH3471-17| MK812299      |                                          |
| Species                  | Order    | Voucher                      | Sample ID | Process ID  | GenBank ID  | Chemistry                  |
|-------------------------|----------|------------------------------|-----------|-------------|-------------|----------------------------|
| *Arthopyrenia salicis*  | Pleosporales | NO, Møre og Romsdal, 2016, J.T. Klepsland | O-L-206774 | OLICH3493-17 | MK812520 |                             |
| *Asahinea chrysantha*   | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195754 | OLICH1626-14 | KY266872 |                             |
| *Bacidia bagliettoana*  | Lecanorales | NO, Akershus, 2009, R. Haugan | O-L-161668 | OLICH282-13 | MG838180 |                             |
| *Bacidia bagliettoana*  | Lecanorales | NO, Troms, 2009, J.T. Klepsland | O-L-164908 | OLICH284-13 | MG838178 |                             |
| *Bacidia subincompta*   | Lecanorales | NO, Finnmark, 2011, E. Timdal | O-L-170623 | OLICH198-13 | MG838157 | no lichen substances       |
| *Bacidia subincompta*   | Lecanorales | NO, Sogn og Fjordane, 2013, J.T. Klepsland | O-L-197862 | OLICH2086-15 | MG838186 |                             |
| *Bacidia subincompta*   | Lecanorales | NO, Østfold, 2001, B.P. Løfall | O-L-105331 | OLICH310-13 | MG838165 |                             |
| *Bacidia subincompta*   | Lecanorales | NO, Oslo, 2014, J.T. Klepsland | O-L-200148 | OLICH3180-16 | MG838175 |                             |
| *Bacidia subincompta*   | Lecanorales | NO, Nordland, 2015, J.T. Klepsland | O-L-206520 | OLICH3420-17 | MG838176 |                             |
| *Bacidia vermifera*     | Lecanorales | NO, Troms, 2011, J.T. Klepsland | O-L-177162 | OLICH264-13 | MG838160 |                             |
| *Bacidia vermifera*     | Lecanorales | NO, Troms, 2009, J.T. Klepsland | O-L-165007 | OLICH299-13 | MG838169 |                             |
| Species               | Order                | Voucher                | Sample ID | Process ID       | GenBank ID | Chemistry |
|----------------------|----------------------|------------------------|-----------|------------------|------------|-----------|
| Bactrospora corticola | Arthoniales          | NO, Nord-Trøndelag, 2010, H. Holien | TRH-L-13774 | OLICH1208-14     | MK811961   |           |
| Bactrospora corticola | Arthoniales          | NO, Nord-Trøndelag, 2009, H. Holien | TRH-L-12953 | OLICH1209-14     | MK811741   |           |
| Bactrospora corticola | Arthoniales          | NO, Nord-Trøndelag, 2009, H. Holien | TRH-L-12974 | OLICH1210-14     | MK811643   |           |
| Bactrospora corticola | Arthoniales          | NO, Sør-Trøndelag, 2010, G. Gaarder | TRH-L-651772 | OLICH1211-14     | MK811979   |           |
| Baeomyces carneus     | Baeomycetales        | NO, Østfold, 2003, B. P. Løfall | O-L-200761 | OLICH2438-16     | MK812695   |           |
| Baeomyces carneus     | Baeomycetales        | NO, Østfold, 2014, S. Vatne | O-L-125189 | OLICH4208-17     | MK811898   |           |
| Baeomyces carneus     | Baeomycetales        | NO, Østfold, 2010, J.T. Klepsland | O-L-174982 | OLICH4421-17     | MK812113   |           |
| Baeomyces placophyllum| Baeomycetales        | NO, Telemark, 2014, E. Timdal | O-L-196267 | OLICH1942-15     | MK812574   |           |
| Baeomyces placophyllum| Baeomycetales        | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196313 | OLICH2243-15     | MK812640   |           |
| Baeomyces rufus       | Baeomycetales        | NO, Telemark, 2014, S. Rui & E. Timdal | O-L-194160 | OLICH1481-14     | MK811923   |           |
| Baeomyces rufus       | Baeomycetales        | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200015 | OLICH1989-15     | MK812462   |           |
| Species                  | Order     | Voucher           | Sample ID | Process ID  | GenBank ID  | Chemistry            |
|-------------------------|-----------|-------------------|-----------|-------------|--------------|----------------------|
| *Baeomyces rufus*       | Baeomycetales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201257 | OLICH2765-16 | MK812004     |                     |
| *Baeomyces rufus*       | Baeomycetales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201258 | OLICH2766-16 | MK812643     |                     |
| *Baeomyces rufus*       | Baeomycetales | NO, Aust-Agder, 2014, J.T. Klepsland | O-L-200581 | OLICH3271-16 | MK812401     |                     |
| *Bilimbia lobulata*     | Lecanorales | NO, Nordland, 2001, B.P. Løfall | O-L-105772 | OLICH469-13 | MK812451     |                     |
| *Bilimbia lobulata*     | Lecanorales | NO, Troms, 2009, J.T. Klepsland | O-L-164992 | OLICH470-13 | MK812712     |                     |
| *Bilimbia lobulata*     | Lecanorales | NO, Nordland, 2000, S. Rui & E. Timdal | O-L-51771  | OLICH471-13 | MK812122     |                     |
| *Bilimbia lobulata*     | Lecanorales | NO, Oppland, 1995, R. Haugan & E. Timdal | O-L-19936  | OLICH630-13 | MK812573     |                     |
| *Bilimbia sabuletorum*  | Lecanorales | NO, Buskerud, 2008, J.T. Klepsland | O-L-158388 | OLICH206-13 | MK812338     |                     |
| *Bilimbia sabuletorum*  | Lecanorales | NO, Telemark, 2010, S. Rui & E. Timdal | O-L-163841 | OLICH207-13 | MK812048     | no lichen substances |
| *Bilimbia sabuletorum*  | Lecanorales | NO, Oslo, 2009, J.T. Klepsland | O-L-164642 | OLICH208-13 | MK812294     |                     |
| *Bilimbia sabuletorum*  | Lecanorales | NO, Aust-Agder, 2010, J.T. Klepsland | O-L-175077 | OLICH209-13 | MK812254     |                     |
| Species                  | Order          | Voucher            | Sample ID | Process ID  | GenBank ID | Chemistry                                      |
|-------------------------|----------------|--------------------|-----------|-------------|------------|------------------------------------------------|
| *Bilimbia sabuletorum*  | Lecanorales    | NO, Hedmark, 2004, R. Haugan | O-L-131717 | OLICH632-13 | MK811845   |                                               |
| *Blastenia ammiospila*  | Teloschistales | NO, Finnmark, 2014, U. Arup | O-L-195889 | OLICH1734-14 | KY266873   |                                               |
| *Blastenia crenularia*  | Teloschistales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196018 | OLICH1863-14 | MK811924   |                                               |
| *Blastenia crenularia*  | Teloschistales | NO, Nordland, 2014, J.T. Klepsland | O-L-200301 | OLICH3173-16 | MK811921   |                                               |
| *Blastenia crenularia*  | Teloschistales | NO, Akershus, 2013, S. Rui & E. Timdal | O-L-203051 | OLICH3289-16 | MK812322   |                                               |
| *Brianaria lutulata*    | Lecanorales    | NO, Aust-Agder, 2015, J.T. Klepsland | O-L-206489 | OLICH3390-17 | MK812659   |                                               |
| *Brianaria tuberculata* | Lecanorales    | NO, Aust-Agder, 2015, J.T. Klepsland | O-L-206488 | OLICH3389-17 | MK811824   |                                               |
| *Brodoa atrofusca*      | Lecanorales    | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200891 | OLICH2544-16 | MK811833   |                                               |
| *Brodoa atrofusca*      | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184308 | OLICH725-13 | MK811829   | atranorin (major), physodic acid (minor), protocetraric acid (major) |
| *Brodoa intestiniformis* | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-190610 | OLICH1474-14 | MK811819   |                                               |
| *Brodoa intestiniformis* | Lecanorales    | NO, Hordaland, 2014, E. Timdal | O-L-195806 | OLICH1678-14 | MK811842   |                                               |
| Species                  | Order            | Voucher            | Sample ID | Process ID          | GenBank ID | Chemistry |
|--------------------------|------------------|--------------------|-----------|---------------------|------------|-----------|
| *Brodoa intestiniformis* | Lecanorales      | NO, Telemark, 2014, E. Timdal | O-L-195819 | OLICH2191-15       | MK812115   |           |
| *Brodoa intestiniformis* | Lecanorales      | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184709 | OLICH928-13        | MK812552   |           |
| *Brodoa oroarctica*     | Lecanorales      | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200939 | OLICH2660-16       | MK811789   |           |
| *Brodoa oroarctica*     | Lecanorales      | NO, Hedmark, 2017, E. Timdal              | O-L-207794 | OLICH4155-17       | MK812012   |           |
| *Brodoa oroarctica*     | Lecanorales      | NO, Oppland, 2013, M. Bendiksby et al.    | O-L-184297 | OLICH726-13        | MK812600   |           |
| *Bryobilimbia diapensiae* | Lecideales     | NO, Finnmark, 2011, E. Timdal              | O-L-170679 | OLICH1167-14       | MK812130   |           |
| *Bryobilimbia diapensiae* | Lecideales     | NO, Nordland, 2012, R. Haugan             | O-L-182225 | OLICH1168-14       | MK811983   |           |
| *Bryobilimbia diapensiae* | Lecideales     | NO, Sør-Trøndelag, 2004, R. Haugan        | O-L-142025 | OLICH144-11        | MK812681   |           |
| *Bryobilimbia diapensiae* | Lecideales     | NO, Troms, 2003, R. Haugan                | O-L-141675 | OLICH145-11        | MK812677   |           |
| *Bryobilimbia diapensiae* | Lecideales     | NO, Finnmark, 2014, S. Rui                | O-L-195960 | OLICH1805-14       | KY266915   |           |
| *Bryobilimbia fissuriseda* | Lecideales     | NO, Oppland, 2005, E. Timdal              | O-L-148945 | OLICH627-13        | MK811695   |           |
| *Bryobilimbia fissuriseda* | Lecideales     | NO, Oppland, 2006, R. Haugan              | O-L-145176 | OLICH628-13        | MK812621   |           |
| Species                  | Order       | Voucher          | Sample ID | Process ID | GenBank ID | Chemistry |
|-------------------------|-------------|------------------|-----------|------------|------------|-----------|
| *Bryobilimbia fissuriseda* | Lecideales  | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184390 | OLICH647-13 | MK811896   |           |
| *Bryobilimbia hypnorum*  | Lecideales  | NO, Nordland, 2014, J.T. Klepsland | O-L-200331 | OLICH3196-16 | MK812370   |           |
| *Bryobilimbia hypnorum*  | Lecideales  | NO, Aust-Agder, 2014, J.T. Klepsland | O-L-200584 | OLICH3198-16 | MK811910   |           |
| *Bryocaulon divergens*   | Lecanorales | NO, Hedmark, 2013, R. Haugan | O-L-190313 | OLICH1472-14 | MK812080   |           |
| *Bryocaulon divergens*   | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195982 | OLICH1827-14 | KY266917   |           |
| *Bryocaulon divergens*   | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196360 | OLICH1919-15 | MK812069   |           |
| *Bryocaulon divergens*   | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196317 | OLICH2247-15 | MK811658   |           |
| *Bryoplasta sinapisperma* | Teloschistales | NO, Troms, 2014, J.T. Klepsland | O-L-200396 | OLICH4055-17 | MK812160   |           |
| *Bryoria bicolor*        | Lecanorales | NO, Buskerud, 2009, S. Svantesson | O-L-157404 | OLICH1369-14 | MK811780   |           |
| *Bryoria bicolor*        | Lecanorales | NO, Rogaland, 2011, J.T. Klepsland | O-L-176874 | OLICH1396-14 | MK812469   |           |
| *Bryoria bicolor*        | Lecanorales | NO, Hedmark, 2012, R. Haugan | O-L-179764 | OLICH1400-14 | MK811677   |           |
| *Bryoria bicolor*        | Lecanorales | NO, Oppland, 2011, J.T. Klepsland | O-L-183745 | OLICH1403-14 | MK812128   |           |
| Species          | Order            | Voucher          | Sample ID | Process ID   | GenBank ID | Chemistry                                      |
|------------------|------------------|------------------|-----------|--------------|------------|------------------------------------------------|
| *Bryoria bicolor* | Lecanorales      | NO, Hedmark, 2012, R. Haugan | O-L-183997 | OLICH1404-14 | MK812174   |                                                |
| *Bryoria capillaris* | Lecanorales      | NO, Oslo, 2014, E. Timdal | O-L-199996 | OLICH1970-15 | MK812045   | alectorialic acid, barbatolic acid            |
| *Bryoria capillaris* | Lecanorales      | SE, Lule Lappmark, 2014, E. Timdal | O-L-195685 | OLICH2008-15 | MK812229   | alectorialic acid, barbatolic acid            |
| *Bryoria capillaris* | Lecanorales      | NO, Telemark, 2014, E. Timdal | O-L-195816 | OLICH2188-15 | MK812443   | alectorialic acid, barbatolic acid            |
| *Bryoria capillaris* | Lecanorales      | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184687 | OLICH871-13  | MK812425   | alectorialic acid, barbatolic acid, fumarprotocetraric acid |
| *Bryoria fremontii* | Lecanorales     | FI, Perä-Pohjanmaa, 2014, E. Timdal | O-L-195488 | OLICH1498-14 | MK812707   |                                                |
| *Bryoria fremontii* | Lecanorales      | SE, Härjedalen, 2014, E. Timdal | O-L-195688 | OLICH2011-15 | MK812076   |                                                |
| *Bryoria fremontii* | Lecanorales      | NO, Hedmark, 2014, R. Haugan | O-L-207993 | OLICH3830-17 | MK812563   |                                                |
| *Bryoria furcellata* | Lecanorales      | FI, Perä-Pohjanmaa, 2014, E. Timdal | O-L-195487 | OLICH1497-14 | MK812435   |                                                |
| *Bryoria furcellata* | Lecanorales      | NO, Buskerud, 2014, E. Timdal | O-L-195834 | OLICH2206-15 | MK811793   |                                                |
| Species             | Order        | Voucher          | Sample ID | Process ID     | GenBank ID | Chemistry          |
|---------------------|--------------|------------------|-----------|----------------|------------|--------------------|
| *Bryoria furcellata* | Lecanorales  | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200527 | OLICH2618-16   | MK812653   |                    |
| *Bryoria furcellata* | Lecanorales  | NO, Hedmark, 2014, R. Haugan          | O-L-207994 | OLICH3831-17   | MK812397   |                    |
| *Bryoria implexa*    | Lecanorales  | FI, Perä-Pohjanmaa, 2014, E. Timdal    | O-L-195485 | OLICH1495-14   | MK812092   | fumarprotocetraric acid |
| *Bryoria implexa*    | Lecanorales  | NO, Finnmark, 2014, E. Timdal           | O-L-195887 | OLICH1732-14   | KY266878   | no lichen substances |
| *Bryoria implexa*    | Lecanorales  | SE, Torne Lappmark, 2014, E. Timdal    | O-L-195665 | OLICH2004-15   | MK812090   | no lichen substances |
| *Bryoria implexa*    | Lecanorales  | SE, Lule Lappmark, 2014, E. Timdal     | O-L-195686 | OLICH2009-15   | MK812159   | no lichen substances |
| *Bryoria implexa*    | Lecanorales  | NO, Vest-Agder, 2013, J.T. Klepsland   | O-L-197823 | OLICH2087-15   | MK812714   | fumarprotocetraric acid |
| *Bryoria implexa*    | Lecanorales  | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196325 | OLICH2255-15   | MK812347   | fumarprotocetraric acid |
| *Bryoria implexa*    | Lecanorales  | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200539 | OLICH2604-16   | MK812375   | fumarprotocetraric acid |
| *Bryoria implexa*    | Lecanorales  | NO, Hedmark, 2017, E. Timdal            | O-L-207753 | OLICH4156-17   | MK811675   | no lichen substances |
| *Bryoria implexa*    | Lecanorales  | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184688 | OLICH872-13    | MK812231   | fumarprotocetraric acid |
| Species             | Order               | Voucher                      | Sample ID | Process ID | GenBank ID | Chemistry                                                                 |
|---------------------|---------------------|------------------------------|-----------|------------|------------|---------------------------------------------------------------------------|
| Bryoria nadvornikiana | Lecanorales         | NO, Sogn og Fjordane, 2008, G. Gaarder | O-L-155318 | OLICH1367-14 | MK812079   | alectorialic acid (major), barbatolic acid (minor), fumarprotocetraric acid (minor) |
| Bryoria nadvornikiana | Lecanorales         | NO, Hedmark, 2012, R. Haugan  | O-L-183994 | OLICH2172-15 | MK811678   |                                                                          |
| Bryoria nadvornikiana | Lecanorales         | NO, Oppland, 2011, J.T. Klepsland | O-L-176834 | OLICH2173-15 | MK812465   |                                                                          |
| Bryoria nadvornikiana | Lecanorales         | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-198885 | OLICH2397-16 | MK812326   |                                                                          |
| Bryoria nadvornikiana | Lecanorales         | NO, Hedmark, 2017, E. Timdal  | O-L-207754 | OLICH4157-17 | MK812417   |                                                                          |
| Bryoria nadvornikiana | Lecanorales         | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184689 | OLICH873-13 | MK812390   |                                                                          |
| Bryoria nitidula     | Lecanorales         | NO, Finnmark, 2014, E. Timdal  | O-L-195715 | OLICH1587-14 | KY266934   | fumarprotocetraric acid (major), protocetraric acid (minor)              |
| Bryoria simplicior   | Lecanorales         | FI, Inarin Lappi, 2014, E. Timdal  | O-L-195506 | OLICH1505-14 | MK812146   |                                                                          |
| Bryoria simplicior   | Lecanorales         | NO, Buskerud, 2014, E. Timdal  | O-L-195825 | OLICH2197-15 | MK812415   |                                                                          |
| Bryoria simplicior   | Lecanorales         | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200936 | OLICH2562-16 | MK811887   |                                                                          |
| Bryoria smithii      | Lecanorales         | NO, Vest-Agder, 2011, J.T. Klepsland | O-L-177044 | OLICH2165-15 | MK811714   |                                                                          |
| Species          | Order       | Voucher          | Sample ID | Process ID | GenBank ID | Chemistry |
|------------------|-------------|------------------|-----------|------------|------------|-----------|
| Bryoria smithii | Lecanorales | NO, Rogaland, 2011, J.T. Klepsland | O-L-176881 | OLICH2166-15 | MK812250   |           |
| Bryoria tenuis   | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal       | O-L-196345 | OLICH1905-15 | MK812591   |           |
| Buellia arnoldii | Caliciales  | NO, Aust-Agder, 2015, H. Holien          | TRH-L-16501 | OLICH3670-17 | MK811634   |           |
| Buellia badia    | Caliciales  | NO, Vestfold, 2015, E. Timdal            | O-L-198941 | OLICH2498-16 | MK812426   |           |
| Buellia disciformis | Caliciales | NO, Troms, 2014, J.T. Klepsland          | O-L-200381 | OLICH4052-17 | MK812587   |           |
| Buellia dives    | Caliciales  | NO, Nord-Trøndelag, 2015, H. Nordin      | TRH-L-16419 | OLICH3631-17 | MK811893   |           |
| Buellia epigaea  | Caliciales  | NO, Finnmark, 2014, E. Timdal            | O-L-195523 | OLICH1507-14 | KY266900   |           |
| Buellia rubescens| Caliciales  | NO, Nord-Trøndelag, 2015, U. Nordin      | O-L-201275 | OLICH3229-16 | MK811955   |           |
| Bunodophoron melanocarpum | Lecanorales | NO, Rogaland, 2011, H. Fjeldstad | O-L-177411 | OLICH1399-14 | MK812059   |           |
| Bunodophoron melanocarpum | Lecanorales | NO, Hordaland, 2011, J.T. Klepsland    | O-L-177097 | OLICH2161-15 | MK812620   |           |
| Bunodophoron melanocarpum | Lecanorales | NO, Sogn og Fjordane, 2010, J.T. Klepsland | O-L-175004 | OLICH2163-15 | MK811949   |           |
| Species                | Order       | Voucher                | Sample ID | Process ID | GenBank ID | Chemistry |
|-----------------------|-------------|------------------------|-----------|------------|------------|-----------|
| *Calicium adspersum*  | Caliciales  | SE, Södermanland, 2015, | O-L-200822| OLICH2410-16| MK812068   |           |
|                       |             | S. Kistenich & E. Timdal|           |            |            |           |
| *Calicium pinicola*   | Caliciales  | NO, Oppland, 2015, R.  | O-L-204191| OLICH4087-17| MK811674   |           |
|                       |             | Haugan                 |           |            |            |           |
| *Calicium viride*     | Caliciales  | NO, Hedmark, 2017, S. Rui & E. Timdal | O-L-207800| OLICH4161-17| MK812371   |           |
| *Callome multipartita*| Peltigerales| NO, Buskerud, 2013, S. Reiso & T. Høitomt | O-L-194256| OLICH2054-15| MK811803   |           |
| *Calogaya biatorina*  | Teloschistales| NO, Sogn og Fjordane, 2013, J.T. Klepsland | O-L-197877| OLICH2459-16| MK812288   |           |
| *Calogaya decipiens*  | Teloschistales| NO, Oslo, 2014, R. Haugan et al. | O-L-196061| OLICH1877-14| MK812143   |           |
| *Calogaya decipiens*  | Teloschistales| NO, Hedmark, 1998, R. Haugan | O-L-55723 | OLICH4389-17| MK812258   |           |
| *Calogaya decipiens*  | Teloschistales| NO, Akershus, 2010, R. Haugan | O-L-167011| OLICH4390-17| MK811994   |           |
| *Caloplasca chlorina* | Teloschistales| NO, Vest-Agder, 2013, J.T. Klepsland | O-L-198079| OLICH4423-17| MK811786   |           |
| *Caloplasca chlorina* | Teloschistales| NO, Telemark, 2014, J.T. Klepsland | O-L-200720| OLICH4425-17| MK811988   |           |
| *Caloplasca demissa*  | Teloschistales| NO, Rogaland, 2010, J.T. Klepsland | O-L-200085| OLICH3270-16| MK812156   |           |
| Species             | Order            | Voucher                     | Sample ID | Process ID        | GenBank ID  | Chemistry                      |
|---------------------|------------------|-----------------------------|-----------|-------------------|-------------|-------------------------------|
| Caloplaca demissa   | Teloschistales   | NO, Sogn og Fjordane, 2010, S. Vatne | O-L-169301 | OLICH3953-17     | MK812032    |                               |
| Caloplaca monacensis| Teloschistales   | NO, Buskerud, 1998, H. Bratli | O-L-39356 | OLICH4422-17     | MK811632    |                               |
| Calvitimela armeniaca | Lecanorales     | NO, Finnmark, 2014, E. Timdal | O-L-195741 | OLICH1613-14     | KY266899    | alectorialic acid              |
| Calvitimela livida  | Lecanorales      | NO, Finnmark, 2014, E. Timdal | O-L-195842 | OLICH1687-14     | KY266947    | atranorin, stictic acid        |
| Calvitimela melaleuca | Lecanorales     | NO, Finnmark, 2014, R. Haugan | O-L-195711 | OLICH1583-14     | KY266838    | alectorialic acid, atranorin   |
| Calvitimela melaleuca | Lecanorales     | NO, Finnmark, 2014, E. Timdal | O-L-195915 | OLICH1760-14     | KY266897    | alectorialic acid, norstictic acid |
| Candelaria concolor | Candelariales    | NO, Rogaland, 2015, T. Tønsberg & E. Nygaard | BG-L-98168 | OLICH3699-17     | MK812350    |                               |
| Candelariella arctica | Candelariales   | NO, Finnmark, 2014, J.T. Klepsland | O-L-200509 | OLICH3171-16     | MK812015    |                               |
| Candelariella aurella | Candelariales   | NO, Troms, 1998, R. Armstrong | TROM_L_50030 | OLICH3532-17     | MK812178    |                               |
| Candelariella coralliza | Candelariales  | NO, Akershus, 2014, E. Timdal | O-L-199992 | OLICH1966-15     | MK812334    |                               |
| Candelariella coralliza | Candelariales   | NO, Buskerud, 2014, E. Timdal | O-L-195833 | OLICH2205-15     | MK812024    |                               |
| Candelariella coralliza | Candelariales   | NO, Aust-Agder, 2004, J.T. Klepsland | O-L-186001 | OLICH2460-16     | MK811884    |                               |
| Species          | Order     | Voucher                                      | Sample ID | Process ID | GenBank ID | Chemistry |
|------------------|-----------|----------------------------------------------|-----------|------------|------------|-----------|
| *Candelariella*  | Candelariales | NO, Telemark, 2015, E. Timdal & S. Rui       | O-L-200875 | OLICH3836-17 | MK812646   |           |
| *coralliza*      |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Troms, 2003, J.W. Bjerke                | TROM_L_521176 | OLICH3583-17 | MK812262   |           |
| *placodizans*    |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Troms, 2009, J.T. Klepsland             | O-L-164896 | OLICH3949-17 | MK811687   |           |
| *placodizans*    |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Nordland, 2000, E. Timdal                | O-L-51849 | OLICH3950-17 | MK811709   |           |
| *placodizans*    |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Oppland, 2009, R. Haugan                | O-L-159822 | OLICH3951-17 | MK812369   |           |
| *placodizans*    |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Telemark, 2008, J.T. Klepsland           | O-L-164600 | OLICH3952-17 | MK812523   |           |
| *vitellina*      |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Nord-Trøndelag, 1999, H. Bratli          | O-L-41044 | OLICH3941-17 | MK811713   |           |
| *vitellina*      |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Vest-Agder, 2011, H. Bratli              | O-L-175901 | OLICH3943-17 | MK811697   |           |
| *vitellina*      |           |                                              |           |            |            |           |
| *Candelariella*  | Candelariales | NO, Oslo, 2010, R. Haugan                   | O-L-166987 | OLICH3948-17 | MK812582   |           |
| *vitellina*      |           |                                              |           |            |            |           |
| *Cetraria aculeata* | Lecanorales | NO, Finnmark, 2014, M. Bendiksby            | O-L-195862 | OLICH1707-14 | KY266883   |           |
| *aculeata*       |           |                                              |           |            |            |           |
| *Cetraria aculeata* | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal       | O-L-196315 | OLICH2245-15 | MK811967   |           |
| *aculeata*       |           |                                              |           |            |            |           |
| *Cetraria aculeata* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan          | O-L-196032 | OLICH3808-17 | MK811881   |           |
| *aculeata*       |           |                                              |           |            |            |           |
| Species            | Order      | Voucher                  | Sample ID | Process ID | GenBank ID | Chemistry |
|--------------------|------------|--------------------------|-----------|------------|------------|-----------|
| Cetraria aculeata  | Lecanorales| NO, Østfold, 2013, K.A. Lye | O-L-194757| OLICH4090-17| MK811694   |           |
| Cetraria aculeata  | Lecanorales| NO, Vest-Agder, 2011, H. Bratli | O-L-175907| OLICH4091-17| MK811732   |           |
| Cetraria ericetorum| Lecanorales| NO, Hedmark, 2013, R. Haugan | O-L-190276| OLICH1469-14| MK811667   |           |
| Cetraria ericetorum| Lecanorales| NO, Finnmark, 2014, E. Timdal | O-L-195750| OLICH1622-14| KY266868   |           |
| Cetraria ericetorum| Lecanorales| NO, Buskerud, 2015, E. Timdal & S. Rui | O-L-200904| OLICH3839-17| MK811635   |           |
| Cetraria ericetorum| Lecanorales| NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184702| OLICH884-13| MK811886   |           |
| Cetraria islandica | Lecanorales| NO, Oslo, 2014, E. Timdal | O-L-200003| OLICH1977-15| MK812195   |           |
| Cetraria islandica | Lecanorales| NO, Telemark, 2014, E. Timdal | O-L-195818| OLICH2190-15| MK812355   |           |
| Cetraria islandica | Lecanorales| NO, Akershus, 2014, E. Timdal | O-L-196304| OLICH2234-15| MK812550   |           |
| Cetraria islandica | Lecanorales| NO, Sør-Trøndelag, 2017, E. Timdal | O-L-208279| OLICH4164-17| MK812647   |           |
| Cetraria islandica | Lecanorales| NO, Sør-Trøndelag, 2017, E. Timdal | O-L-208278| OLICH4165-17| MK812026   |           |
| Cetraria islandica | Lecanorales| NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184703| OLICH885-13| MK812121   |           |
| Species          | Order       | Voucher                | Sample ID | Process ID | GenBank ID | Chemistry   |
|------------------|-------------|------------------------|-----------|------------|------------|-------------|
| *Cetraria muricata* | Lecanorales | NO, Hordaland, 2014, E. Timdal | O-L-195799 | OLICH1671-14 | MK812154   |             |
| *Cetraria muricata* | Lecanorales | NO, Telemark, 2014, E. Timdal | O-L-195815 | OLICH2187-15 | MK812716   |             |
| *Cetraria nigricans* | Lecanorales | NO, Troms, 2012, J.T. Klepsland | O-L-186197 | OLICH1436-14 | MK812225   |             |
| *Cetraria nigricans* | Lecanorales | NO, Finnmark, 2011, E. Timdal | O-L-170662 | OLICH2159-15 | MK812613   |             |
| *Cetraria odontella* | Lecanorales | NO, Buskerud, 2012, T.H. Hofton | O-L-194457 | OLICH1485-14 | MK812629   |             |
| *Cetraria sepincola* | Lecanorales | NO, Hedmark, 2013, R. Haugan | O-L-190020 | OLICH1463-14 | MK812418   |             |
| *Cetraria sepincola* | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200881 | OLICH2538-16 | MK812133   |             |
| *Cetraria sepincola* | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184705 | OLICH886-13 | MK811790   |             |
| *Cetrariella commixta* | Lecanorales | NO, Finnmark, 2014, M. Westberg | O-L-195926 | OLICH1771-14 | KY266843   |             |
| *Cetrariella delisei* | Lecanorales | NO, Oppland, 2013, R. Haugan | O-L-190044 | OLICH1465-14 | MK812542   |             |
| *Cetrariella delisei* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195559 | OLICH1517-14 | KY266903   |             |
| *Cetrariella delisei* | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195763 | OLICH1635-14 | KY266858   |             |
| Species                      | Order        | Voucher         | Sample ID | Process ID | GenBank ID | Chemistry                                                                 |
|------------------------------|--------------|-----------------|-----------|------------|------------|---------------------------------------------------------------------------|
| *Cetrariella delisei*        | Lecanorales  | NO, Finnmark,   | O-L-195882| OLICH1727-14| KY266955   | anziaic acid (minor), atranorin (major), perlatic acid (major), 4-O-methylolivetoric acid (minor) |
|                              |              | 2014, M. Westber |           |            |            |                                                                           |
| *Cetrariella delisei*        | Lecanorales  | NO, Finnmark,   | O-L-195946| OLICH1791-14| KY266892   |                                                                           |
|                              |              | 2014, H. Holien  |           |            |            |                                                                           |
| *Cetrariella delisei*        | Lecanorales  | NO, Buskerud,   | O-L-200893| OLICH2546-16| MK811762   |                                                                           |
|                              |              | 2015, S. Rui &  |           |            |            |                                                                           |
|                              |              | E. Timdal       |           |            |            |                                                                           |
| *Cetrariella fastigiata*     | Lecanorales  | NO, Finnmark,   | O-L-195560| OLICH1518-14| KY266875   |                                                                           |
|                              |              | 2014, E. Timdal  |           |            |            |                                                                           |
| *Cetrariella fastigiata*     | Lecanorales  | NO, Finnmark,   | O-L-195762| OLICH1634-14| KY266870   |                                                                           |
|                              |              | 2014, H. Holien  |           |            |            |                                                                           |
| *Cetrariella fastigiata*     | Lecanorales  | NO, Finnmark,   | O-L-195985| OLICH1830-14| KY266890   |                                                                           |
|                              |              | 2014, R. Haugan  |           |            |            |                                                                           |
| *Cetrariella fastigiata*     | Lecanorales  | NO, Finnmark,   | O-L-170481| OLICH2154-15| MK811637   |                                                                           |
|                              |              | 2011, E. Timdal  |           |            |            |                                                                           |
| *Cetrariella fastigiata*     | Lecanorales  | NO, Troms,      | O-L-177156| OLICH2155-15| MK812493   |                                                                           |
|                              |              | 2011, J.T. Klepsland |         |            |            |                                                                           |
| *Cetrelia cetrarioides*      | Lecanorales  | NO, Telemark,   | O-L-141329| OLICH1354-14| MK811823   |                                                                           |
|                              |              | 2005, S. Reiso  |           |            |            |                                                                           |
| *Cetrelia cetrarioides*      | Lecanorales  | NO, Oppland,    | O-L-176836| OLICH1395-14| MK812086   |                                                                           |
|                              |              | 2011, J.T. Klepsland |       |            |            |                                                                           |
| Species              | Order         | Voucher                          | Sample ID | Process ID   | GenBank ID | Chemistry                                                                 |
|----------------------|---------------|----------------------------------|-----------|--------------|------------|---------------------------------------------------------------------------|
| *Cetrelia cetrarioides* | Lecanorales   | NO, Sogn og Fjordane, 2009, T.H. Hofton | O-L-186891 | OLICH1453-14 | MK812180   | anziaic acid (minor), atranorin (major), perlatolic acid (major), 4-O-methylolivetoric acid (minor) |
| *Cetrelia cetrarioides* | Lecanorales   | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200022 | OLICH2470-16 | MK812062   | anziaic acid (minor), atranorin (major), perlatolic acid (major), 4-O-methylolivetoric acid (minor) |
| *Cetrelia cetrarioides* | Lecanorales   | NO, Oppland, 2015, E. Timdal      | O-L-201355 | OLICH2740-16 | MK812302   | anziaic acid (minor), atranorin (major), perlatolic acid (major), 4-O-methylolivetoric acid (minor) |
| *Cetrelia cetrarioides* | Lecanorales   | NO, Buskerud, 2016, M. Bendiksby & E. Timdal | O-L-208029 | OLICH4257-17 | MK812008   | anziaic acid (minor), atranorin (major), perlatolic acid (major), 4-O-methylolivetoric acid (minor) |
| *Cetrelia monachorum*  | Lecanorales   | NO, Buskerud, 2012, T.H. Hofton    | O-L-194448 | OLICH4095-17 | MK811729   | anziaic acid (minor), atranorin (major), imbricaric acid (major), 4-O-demethylimbricaric acid (minor) |
| *Chaenotheca chlorella* | Coniocybales  | NO, Sør-Trøndelag, 2014, S. Vatne | O-L-200765 | OLICH2447-16 | MK812013   |                                                                 |
| *Chaenotheca ferruginea* | Coniocybales  | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200838 | OLICH2426-16 | MK812287   |                                                                 |
| Species                  | Order            | Voucher         | Sample ID   | Process ID    | GenBank ID | Chemistry |
|--------------------------|------------------|-----------------|-------------|---------------|------------|-----------|
| Chaenotheca gracilenta  | Coniocybales     | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201318  | OLICH2790-16  | MK812452   |           |
| Chaenotheca gracillima   | Coniocybales     | NO, Sør-Trøndelag, 2014, S. Vatne | O-L-200773  | OLICH2446-16  | MK812119   |           |
| Cladonia albonigra       | Lecanorales      | NO, Troms, 2014, E. Timdal | O-L-195659  | OLICH1999-15  | MK812147   |           |
| Cladonia amaurocraea     | Lecanorales      | NO, Troms, 2014, E. Timdal | O-L-195776  | OLICH1648-14  | MK811717   |           |
| Cladonia amaurocraea     | Lecanorales      | NO, Finnmark, 2014, H. Holien | O-L-195877  | OLICH1722-14  | KY266961   |           |
| Cladonia amaurocraea     | Lecanorales      | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196364  | OLICH1923-15  | MK812471   |           |
| Cladonia amaurocraea     | Lecanorales      | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196316  | OLICH2246-15  | MK811885   |           |
| Cladonia arbuscula       | Lecanorales      | NO, Finnmark, 2014, A. Kosuthova | O-L-195866  | OLICH1711-14  | KY266933   |           |
| Cladonia arbuscula       | Lecanorales      | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196358  | OLICH1917-15  | MK812466   |           |
| Cladonia arbuscula       | Lecanorales      | NO, Telemark, 2014, E. Timdal | O-L-196268  | OLICH1943-15  | MK811810   |           |
| Cladonia arbuscula       | Lecanorales      | NO, Akershus, 2014, E. Timdal | O-L-196301  | OLICH2231-15  | MK812036   |           |
| Species          | Order       | Voucher       | Sample ID       | Process ID | GenBank ID | Chemistry |
|------------------|-------------|---------------|-----------------|------------|------------|-----------|
| Cladonia arbuscula | Lecanorales | NO, Vestfold, 2015, E. Timdal | O-L-198942 | OLICH2497-16 | MK811763 |           |
| Cladonia bellidiflora | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195740 | OLICH1612-14 | KY266902 |           |
| Cladonia bellidiflora | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195881 | OLICH1726-14 | KY266913 |           |
| Cladonia bellidiflora | Lecanorales | NO, Finnmark, 2014, A. Kosuthova | O-L-195906 | OLICH1751-14 | KY266845 |           |
| Cladonia bellidiflora | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195958 | OLICH1803-14 | KY266921 |           |
| Cladonia caespiticia | Lecanorales | NO, Østfold, 2012, J.T. Klepsland | O-L-186036 | OLICH1420-14 | MK811962 |           |
| Cladonia caespiticia | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200916 | OLICH2576-16 | MK812605 |           |
| Cladonia caespiticia | Lecanorales | NO, Hordaland, 2011, J.T. Klepsland | O-L-183605 | OLICH4081-17 | MK811712 |           |
| Cladonia cariosa | Lecanorales | NO, Buskerud, 2012, E.W. Hanssen et al. | O-L-186370 | OLICH1443-14 | MK811826 |           |
| Cladonia cariosa | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184343 | OLICH743-13 | MK812622 |           |
| Cladonia carneola | Lecanorales | NO, Finnmark, 2014, A. Kosuthova | O-L-195963 | OLICH1808-14 | KY266855 |           |
| Cladonia cenotea | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-196307 | OLICH2237-15 | MK811749 |           |
| Species              | Order            | Voucher            | Sample ID       | Process ID     | GenBank ID  | Chemistry |
|----------------------|------------------|--------------------|-----------------|----------------|-------------|-----------|
| Cladonia cenotea     | Lecanorales      | NO, Hedmark, 2014, R. Haugan | O-L-198892      | OLICH2393-16   | MK812468    |           |
| Cladonia cenotea     | Lecanorales      | NO, Hedmark, 2014, R. Haugan | O-L-207986      | OLICH3824-17   | MK812541    |           |
| Cladonia cenotea     | Lecanorales      | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201300      | OLICH3855-17   | MK812267    |           |
| Cladonia cenotea     | Lecanorales      | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184714      | OLICH932-13    | MK812699    |           |
| Cladonia chlorophaea | Lecanorales      | NO, Buskerud, 2016, S. Rui & E. Timdal | O-L-208034      | OLICH4262-17   | MK812242    |           |
| Cladonia coccifera   | Lecanorales      | NO, Finnmark, 2014, H. Holien | O-L-195895      | OLICH1740-14   | KY266935    |           |
| Cladonia coniocraea  | Lecanorales      | NO, Akershus, 2014, E. Timdal | O-L-196310      | OLICH2240-15   | MK812094    |           |
| Cladonia coniocraea  | Lecanorales      | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200908      | OLICH2569-16   | MK812138    |           |
| Cladonia cornuta     | Lecanorales      | NO, Akershus, 2014, E. Timdal | O-L-196260      | OLICH2267-15   | MK812497    |           |
| Cladonia cornuta     | Lecanorales      | NO, Hedmark, 2015, E. Timdal | O-L-200857      | OLICH2508-16   | MK812414    |           |
| Cladonia cornuta     | Lecanorales      | NO, Hedmark, 2016, E. Timdal | O-L-201516      | OLICH3979-17   | MK811731    |           |
| Cladonia cornuta     | Lecanorales      | NO, Telemark, 2017, E. Timdal | O-L-208059      | OLICH4167-17   | MK812047    |           |
| Species        | Order     | Voucher            | Sample ID | Process ID | GenBank ID   | Chemistry |
|---------------|-----------|--------------------|-----------|------------|--------------|-----------|
| *Cladonia cornuta* | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184715 | OLICH933-13 | MK812277    |           |
| *Cladonia crispata* | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195880 | OLICH1725-14 | KY266965    |           |
| *Cladonia crispata* | Lecanorales | NO, Buskerud, 2014, E. Timdal | O-L-195824 | OLICH2196-15 | MK811863    |           |
| *Cladonia crispata* | Lecanorales | NO, Telemark, 2016, S. Rui & E. Timdal | O-L-205005 | OLICH3995-17 | MK811728    |           |
| *Cladonia crispata* | Lecanorales | NO, Vest-Agder, 2016, S. Rui & E. Timdal | O-L-204984 | OLICH3996-17 | MK812514    |           |
| *Cladonia crispata* | Lecanorales | NO, Telemark, 2017, E. Timdal | O-L-208058 | OLICH4275-17 | MK811707    |           |
| *Cladonia cyanipes* | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195758 | OLICH1630-14 | KY266889    |           |
| *Cladonia cyanipes* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195981 | OLICH1826-14 | KY266977    |           |
| *Cladonia cyathomorpha* | Lecanorales | NO, Vest-Agder, 2012, J.T. Klepsland | O-L-186087 | OLICH1430-14 | MK811836    |           |
| *Cladonia cyathomorpha* | Lecanorales | NO, Aust-Agder, 2010, J.T. Klepsland | O-L-175272 | OLICH2147-15 | MK811648    |           |
| *Cladonia decorticata* | Lecanorales | SE, Torne Lappmark, 2014, E. Timdal | O-L-195679 | OLICH2006-15 | MK811738    |           |
| Species          | Order          | Voucher   | Sample ID   | Process ID   | GenBank ID | Chemistry           |
|------------------|----------------|-----------|-------------|--------------|------------|---------------------|
| *Cladonia ecmocyna* | Lecanorales | NO, Hordaland, 2014, E. Timdal | O-L-195793 | OLICH1665-14 | MK812344   |                     |
| *Cladonia ecmocyna* | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195956 | OLICH1801-14 | KY266972   |                     |
| *Cladonia ecmocyna* | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200933 | OLICH2559-16 | MK812085   |                     |
| *Cladonia fimbriata* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195743 | OLICH1615-14 | KY266953   |                     |
| *Cladonia fimbriata* | Lecanorales | NO, Vest-Agder, 2011, J.T. Klepsland | O-L-183619 | OLICH2145-15 | MK812488 | fumarprotocetraric acid |
| *Cladonia fimbriata* | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200909 | OLICH2570-16 | MK811629   |                     |
| *Cladonia furcata* | Lecanorales | NO, Buskerud, 2011, K.A. Lye & T. Høitomt | O-L-194749 | OLICH1492-14 | MK811985   |                     |
| *Cladonia furcata* | Lecanorales | NO, Finnmark, 2014, T. Tønsberg | O-L-195964 | OLICH1809-14 | KY266930   |                     |
| *Cladonia furcata* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196298 | OLICH2228-15 | MK812624   |                     |
| *Cladonia furcata* | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-196308 | OLICH2238-15 | MK811830   |                     |
| *Cladonia furcata* | Lecanorales | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201273 | OLICH3847-17 | MK812251   |                     |
| *Cladonia gracilis* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195764 | OLICH1636-14 | KY266906 |                     |
| Species          | Order      | Voucher                      | Sample ID | Process ID      | GenBank ID   | Chemistry                      |
|------------------|------------|------------------------------|-----------|-----------------|--------------|--------------------------------|
| *Cladonia gracilis* | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196359 | OLICH1918-15    | MK812362     |                                |
| *Cladonia gracilis* | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196321 | OLICH2251-15    | MK811813     |                                |
| *Cladonia gracilis* | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-196262 | OLICH2269-15    | MK811638     |                                |
| *Cladonia gracilis* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196047 | OLICH3802-17    | MK812342     |                                |
| *Cladonia grayi*   | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195757 | OLICH1629-14    | KY266978     |                                |
| *Cladonia krogiana* | Lecanorales | NO, Telemark, 2003, B.P. Løfall & A. Ognedal | O-L-127158 | OLICH1337-14    | MK811907     | barbatic acid, chlorovinetorin |
| *Cladonia krogiana* | Lecanorales | NO, Akershus, 2004, B.P. Løfall | O-L-129021 | OLICH1339-14    | MK811663     | barbatic acid, chlorovinetorin |
| *Cladonia krogiana* | Lecanorales | NO, Akershus, 2012, J.T. Klepsland | O-L-186068 | OLICH2136-15    | MK812057     |                                |
| *Cladonia macrophylla* | Lecanorales | NO, Oslo, 2014, E. Timdal | O-L-200002 | OLICH1976-15    | MK811782     |                                |
| *Cladonia macrophylla* | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200021 | OLICH2469-16    | MK812683     |                                |
| *Cladonia macrophyllodes* | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196379 | OLICH1938-15    | MK812614     |                                |
| Species         | Order                  | Voucher                  | Sample ID   | Process ID    | GenBank ID     | Chemistry                        |
|-----------------|------------------------|--------------------------|-------------|---------------|----------------|-----------------------------------|
| *Cladonia maxima* | Lecanorales            | NO, Buskerud, 2014, E. Timdal | O-L-195829  | OLICH2201-15  | MK811693       | usnic acid, zeorin               |
| *Cladonia maxima* | Lecanorales            | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184361  | OLICH692-13   | MK812518       | fumarprotocetraric acid, psoromic acid |
| *Cladonia mitis*  | Lecanorales            | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184706  | OLICH887-13   | MK811894       | fumarprotocetraric acid, psoromic acid |
| *Cladonia parasitica* | Lecanorales           | NO, Hedmark, 2014, R. Haugan | O-L-207988  | OLICH3825-17  | MK811639       | fumarprotocetraric acid (major), protocetraric acid (minor) |
| *Cladonia parasitica* | Lecanorales           | NO, Hedmark, 2016, E. Timdal | O-L-201525  | OLICH3989-17  | MK812470       | fumarprotocetraric acid (major), protocetraric acid (minor) |
| *Cladonia phyllophora* | Lecanorales        | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196375  | OLICH1934-15  | MK812644       | fumarprotocetraric acid (major), protocetraric acid (minor) |
| *Cladonia phyllophora* | Lecanorales        | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196320  | OLICH2250-15  | MK812551       | fumarprotocetraric acid (major), protocetraric acid (minor) |
| *Cladonia pleurota* | Lecanorales            | NO, Finnmark, 2014, E. Timdal | O-L-195959  | OLICH1804-14  | KY266968       | fumarprotocetraric acid, psoromic acid |
| *Cladonia pulvinata* | Lecanorales            | NO, Sør-Trøndelag, 2015, H. Holien | TRH-L-16327 | OLICH2920-16  | MK811846       | fumarprotocetraric acid, psoromic acid |
| *Cladonia pyxidata* | Lecanorales            | NO, Østfold, 2012, J.T. Klepsland | O-L-186049  | OLICH1425-14  | MK812571       | fumarprotocetraric acid            |
| *Cladonia pyxidata* | Lecanorales            | NO, Finnmark, 2014, E. Timdal | O-L-195914  | OLICH1759-14  | KY266877       | fumarprotocetraric acid (major), protocetraric acid (minor) |
| Species                | Order       | Voucher               | Sample ID   | Process ID     | GenBank ID    | Chemistry                        |
|-----------------------|-------------|-----------------------|-------------|----------------|---------------|----------------------------------|
| *Cladonia pyxidata*   | Lecanorales | NO, Oslo, 2014, S. Rui & E. Timdal | O-L-196073  | OLICH1889-14   | MK812676      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195755  | OLICH1627-14   | KY266984      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Troms, 2014, E. Timdal | O-L-195774  | OLICH1646-14   | MK811970      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-196302  | OLICH2232-15   | MK812460      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196037  | OLICH3806-17   | MK811708      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201298  | OLICH3854-17   | MK812260      |                                  |
| *Cladonia rangiferina*| Lecanorales | NO, Telemark, 2012, S. Reiso | O-L-194209  | OLICH2062-15   | MK812118      | atranorin                       |
| *Cladonia rangiformis*| Lecanorales | NO, Rogaland, 2013, J.T. Klepsland | O-L-198309  | OLICH2351-15   | MK811656      |                                  |
| *Cladonia rei*        | Lecanorales | NO, Telemark, 2014, S. Rui & E. Timdal | O-L-194142  | OLICH1479-14   | MK811774      |                                  |
| *Cladonia rei*        | Lecanorales | NO, Oslo, 2014, J.T. Klepsland | O-L-200262b | OLICH4086-17   | MK812389      | fumarprotocetraric acid, homosekikaic acid |
| *Cladonia squamosa*   | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184733  | OLICH1415-14   | MK812303      |                                  |
| *Cladonia squamosa*   | Lecanorales | NO, Troms, 2014, E. Timdal | O-L-195646  | OLICH1558-14   | MK811958      |                                  |
| Species                  | Order      | Voucher                            | Sample ID     | Process ID   | GenBank ID | Chemistry |
|--------------------------|------------|------------------------------------|---------------|--------------|------------|-----------|
| Cladonia squamosa        | Lecanorales| NO, Finnmark, 2014, H. Holien       | O-L-195909    | OLICH1754-14 | KY266973  |
| Cladonia squamosa        | Lecanorales| NO, Akershus, 2014, E. Timdal       | O-L-196309    | OLICH2239-15 | MK812360  |
| Cladonia stellaris       | Lecanorales| NO, Finnmark, 2014, A. Kosuthova    | O-L-195905    | OLICH1750-14 | KY266887  |
| Cladonia stellaris       | Lecanorales| NO, Akershus, 2014, E. Timdal       | O-L-196263    | OLICH2270-15 | MK812506  |
| Cladonia stellaris       | Lecanorales| NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184707   | OLICH926-13 | MK812280  |
| Cladonia straminea       | Lecanorales| NO, Finnmark, 2014, E. Timdal       | O-L-195976    | OLICH1821-14 | KY266880  |
| Cladonia strepsilis      | Lecanorales| NO, Oslo, 2014, E. Timdal           | O-L-200000    | OLICH1974-15 | MK812544  |
| Cladonia strepsilis      | Lecanorales| NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208340   | OLICH4270-17 | MK812494  |
| Cladonia stygia           | Lecanorales| NO, Telemark, 2014, E. Timdal       | O-L-196269    | OLICH1944-15 | MK812684  |
| Cladonia stygia           | Lecanorales| NO, Akershus, 2014, E. Timdal       | O-L-196303    | OLICH2233-15 | MK812337  |
| Cladonia stygia           | Lecanorales| NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184708   | OLICH927-13 | MK812669  |
| Cladonia subcervicornis   | Lecanorales| NO, Rogaland, 2013, S. Vatne         | O-L-194122    | OLICH2072-15 | MK812018  |
| Species          | Order      | Voucher                  | Sample ID | Process ID       | GenBank ID | Chemistry |
|------------------|------------|--------------------------|-----------|------------------|------------|-----------|
| *Cladonia subcervicornis* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196028 | OLICH3794-17     | MK812661   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subcervicornis* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196053 | OLICH3811-17     | MK812155   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subcervicornis* | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204985 | OLICH3998-17     | MK811825   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subfurcata*    | Lecanorales | NO, Vest-Agder, 2011, J.T. Klepsland | O-L-176962 | OLICH4113-17     | MK812379   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subfurcata*    | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195987 | OLICH1832-14     | KY266923   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subfurcata*    | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196319 | OLICH2249-15     | MK812649   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subfurcata*    | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200934 | OLICH2560-16     | MK812597   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subulata*      | Lecanorales | NO, Sør-Trøndelag, 2013, R. Haugan | O-L-190281 | OLICH1471-14     | MK812581   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subulata*      | Lecanorales | FI, Inarin Lappi, 2014, E. Timdal | O-L-195490 | OLICH1500-14     | MK811811   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subulata*      | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-196299 | OLICH2229-15     | MK812279   |           |
|                  |            |                          |           |                  |            |           |
| *Cladonia subulata*      | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200914 | OLICH2574-16     | MK811787   |           |
| Species              | Order             | Voucher           | Sample ID    | Process ID       | GenBank ID   | Chemistry       |
|----------------------|-------------------|-------------------|--------------|------------------|--------------|-----------------|
| Cladonia sulphurina  | Lecanorales       | NO, Finnmark, 2014, A. Kosuthova | O-L-195911 | OLICH1756-14     | KY266846     |                 |
| Cladonia symphycarpa | Lecanorales       | NO, Finnmark, 2014, E. Timdal         | O-L-195597 | OLICH1535-14     | MK811971     | atranorin       |
| Cladonia turgida     | Lecanorales       | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-199980 | OLICH1954-15     | MK811657     |                 |
| Cladonia turgida     | Lecanorales       | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200932 | OLICH2558-16     | MK812027     |                 |
| Cladonia uncialis    | Lecanorales       | NO, Østfold, 2013, R. Haugan         | O-L-190182 | OLICH1467-14     | MK812589     |                 |
| Cladonia uncialis    | Lecanorales       | NO, Finnmark, 2014, H. Holien          | O-L-195939 | OLICH1784-14     | KY266974     |                 |
| Cladonia verticillata| Lecanorales       | NO, Hordaland, 2014, E. Timdal        | O-L-195797 | OLICH1669-14     | MK812461     |                 |
| Cladonia verticillata| Lecanorales       | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196312 | OLICH2242-15     | MK811806     |                 |
| Cladonia verticillata| Lecanorales       | NO, Sør-Trøndelag, 2015, H. Holien    | TRH-L-16326 | OLICH2921-16     | MK812385     | fumarprotocetraric acid |
| Cladonia zopfii      | Lecanorales       | NO, Sør-Trøndelag, 2014, R. Haugan    | O-L-196044 | OLICH3804-17     | MK811805     |                 |
| Cocotrema citrinescens| Pertusariales   | NO, Nordland, 2015, T. Tønsberg & A. Botnen | BG-L-99172 | OLICH3741-17     | MK811814     |                 |
| Species               | Order            | Voucher                        | Sample ID | Process ID      | GenBank ID | Chemistry  |
|----------------------|------------------|--------------------------------|-----------|----------------|------------|------------|
| *Coccotrema citrinescens* | Pertusariales    | NO, Nordland, 2015, T. Tønsberg | BG-L-98897 | OLICH3754-17   | MK811895   |            |
| *Coccotrema citrinescens* | Pertusariales    | NO, Møre og Romsdal, 2015, T. Tønsberg & Z. Palice | BG-L-99069 | OLICH3774-17   | MK812329   |            |
| *Coccotrema citrinescens* | Pertusariales    | NO, Nordland, 2013, J.T. Klepsland | O-L-198020 | OLICH4212-17   | MK812183   |            |
| *Coccotrema citrinescens* | Pertusariales    | NO, Sør-Trøndelag, 2011, R. Haugan | O-L-173864 | OLICH4403-17   | MK812186   | stictic acid |
| *Cornicularia normoerica* | Lecanorales      | NO, Aust-Agder, 2014, J.T. Klepsland | O-L-200754 | OLICH2603-16   | MK812042   |            |
| *Cornicularia normoerica* | Lecanorales      | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201280 | OLICH3850-17   | MK811980   |            |
| *Cystocoleus ebeneus*   | Capnodiales      | NO, Sør-Trøndelag, 1998, R. Haugan | O-L-55770  | OLICH3942-17   | MK811795   |            |
| *Dactylina ramulosa*    | Lecanorales      | NO, Troms, 2012, J.T. Klepsland | O-L-186199 | OLICH1438-14   | MK812632   |            |
| *Dendrographa latebrarum* | Arthoniales      | NO, Møre og Romsdal, 2016, H. Holien | TRHL-16972 | OLICH3682-17   | MK811843   |            |
| *Dermatocarpon bachmannii* | Verrucariales   | NO, Østfold, 2000, B. P. Løfall et al. | O-L-78257  | OLICH2297-15   | MK812540   |            |
| Species                  | Order       | Voucher   | Sample ID | Process ID        | GenBank ID | Chemistry |
|--------------------------|-------------|-----------|-----------|-------------------|------------|-----------|
| *Dermatocarpon* balletannii | Verrucariales | NO, Østfold, 2005, B. P. Løfall | O-L-147654 | OLICH2305-15     | MK812444   |           |
| *Dermatocarpon* deminuens | Verrucariales | NO, Østfold, 2000, B. P. Løfall | O-L-78264  | OLICH2298-15     | MK812502   |           |
| *Dermatocarpon* deminuens | Verrucariales | NO, Østfold, 1998, B. P. Løfall | O-L-36303  | OLICH2299-15     | MK812476   |           |
| *Dermatocarpon* deminuens | Verrucariales | NO, Østfold, 2000, B. P. Løfall et al. | O-L-78258  | OLICH2304-15     | MK812075   |           |
| *Dermatocarpon* luridum   | Verrucariales | NO, Buskerud, 2009, T.H. Hofton | O-L-187021 | OLICH1455-14     | MK812236   |           |
| *Dermatocarpon* meiophyllizium | Verrucariales | NO, Østfold, 2006, B. P. Løfall | O-L-147725 | OLICH2296-15     | MK812273   |           |
| *Dermatocarpon* meiophyllizium | Verrucariales | NO, Hedmark, 2006, R. Haugan | O-L-145251 | OLICH2300-15     | MK812522   |           |
| *Dermatocarpon* meiophyllizium | Verrucariales | NO, Østfold, 2001, B. P. Løfall | O-L-105979 | OLICH2306-15     | MK811820   |           |
| *Dermatocarpon* miniatum   | Verrucariales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196009 | OLICH1854-14     | MK812245   |           |
| *Dibaeis* baeomyces       | Pertusariales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200009 | OLICH1983-15     | MK812560   |           |
| *Dibaeis* baeomyces       | Pertusariales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201296 | OLICH2796-16     | MK812219   |           |
| Species                  | Order       | Voucher         | Sample ID   | Process ID | GenBank ID | Chemistry |
|-------------------------|-------------|-----------------|-------------|------------|------------|-----------|
| Diploschistes scruposus | Ostropales  | NO, Finnmark,   | O-L-195913  | OLICH1758-14 | KY266920  |
|                         |             | 2014, S. Fernandez |            |            |            |           |
| Diploschistes scruposus | Ostropales  | NO, Aust-Agder, | O-L-198319  | OLICH2350-15 | MK811671  |
|                         |             | 2013, J.T. Klepsland |            |            |            |           |
| Diplotomma alboatrum    | Calic peace | NO, Finnmark,   | O-L-195577  | OLICH1527-14 | MK812220  |
|                         |             | 2014, E. Timdal  |            |            |            |           |
| Eopyrenula leucoplaca   | Vezdae pace | NO, Telemark,   | O-L-206771  | OLICH3490-17 | MK811948  |
|                         |             | 2016, J.T. Klepsland |            |            |            |           |
| Epilichen glauconigells | Rhizocarpals| NO, Oppland,    | O-L-179907  | OLICH1100-14 | MK812566  |
|                         |             | 2012, S. Rui & E. Timdal |          |            |            |           |
| Epilichen glauconigells | Rhizocarpals| NO, Troms,      | O-L-141634  | OLICH1101-14 | MK811705  |
|                         |             | 2003, R. Haugan  |            |            |            |           |
| Epilichen scabrosus     | Rhizocarpals| NO, Hedmark,    | O-L-179955  | OLICH1102-14 | MK812558  |
|                         |             | 2012, S. Rui & E. Timdal |          |            |            |           |
| Epilichen scabrosus     | Rhizocarpals| NO, Troms,      | O-L-164936  | OLICH832-13 | MK812386  |
|                         |             | 2009, J.T. Klepsland |            |            |            |           |
| Evernia divaricata      | Lecanorale s | NO, Buskerud,   | O-L-194431  | OLICH1484-14 | MK812536  |
|                         |             | 2011, T.H. Hofton |            |            |            |           |
| Evernia divaricata      | Lecanorale s | NO, Oppland,    | O-L-194526  | OLICH2315-15 | MK811891  |
|                         |             | 2012, T.H. Hofton |            |            |            |           |
| Evernia mesomorpha      | Lecanorale s | NO, Hedmark,    | O-L-194511  | OLICH1489-14 | MK812555  |
|                         |             | 2012, T.H. Hofton |            |            |            |           |
| Evernia mesomorpha      | Lecanorale s | NO, Buskerud,   | O-L-200008  | OLICH1982-15 | MK811689  |
|                         |             | 2014, S. Rui & E. Timdal |          |            |            |           |
| Species          | Order         | Voucher                  | Sample ID     | Process ID    | GenBank ID  | Chemistry |
|------------------|---------------|--------------------------|---------------|--------------|-------------|-----------|
| *Evernia mesomorpha* | Lecanorales   | NO, Oppland, 2011, J.T. Klepsland | O-L-176825   | OLICH2308-15 | MK811679    |           |
| *Evernia mesomorpha* | Lecanorales   | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200526   | OLICH2614-16 | MK812464    |           |
| *Evernia prunastri* | Lecanorales   | NO, Oslo, 2014, S. Rui & E. Timdal | O-L-196076   | OLICH1892-14 | MK811993    |           |
| *Evernia prunastri* | Lecanorales   | NO, Akershus, 2014, E. Timdal | O-L-199988   | OLICH1962-15 | MK812247    |           |
| *Evernia prunastri* | Lecanorales   | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196292   | OLICH2222-15 | MK812058    |           |
| *Evernia prunastri* | Lecanorales   | NO, Hedmark, 2015, E. Timdal | O-L-200856   | OLICH2507-16 | MK811838    |           |
| *Evernia prunastri* | Lecanorales   | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200923   | OLICH2531-16 | MK811722    |           |
| *Flavocetraria cucullata* | Lecanorales | NO, Østfold, 2013, B.P. Løfall | O-L-187362   | OLICH1459-14 | MK812129    |           |
| *Flavocetraria cucullata* | Lecanorales | NO, Finnmark, 2014, S. Rui | O-L-195752   | OLICH1624-14 | KY266924    |           |
| *Flavocetraria cucullata* | Lecanorales | NO, Troms, 2014, E. Timdal | O-L-195778   | OLICH1650-14 | MK811878    |           |
| *Flavocetraria cucullata* | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196338   | OLICH2276-15 | MK812660    |           |
| *Flavocetraria cucullata* | Lecanorales | NO, Svalbard, 2015, S. Rui | O-L-203288   | OLICH2707-16 | MK812458    |           |
| Species                  | Order          | Voucher                  | Sample ID | Process ID  | GenBank ID | Chemistry |
|-------------------------|----------------|--------------------------|-----------|-------------|------------|-----------|
| *Flavocetraria cucullata* | Lecanorales    | NO, Buskerud, 2015, E. Timdal & S. Rui | O-L-200903 | OLICH3838-17 | MK812490   |           |
| *Flavocetraria cucullata* | Lecanorales    | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184721 | OLICH938-13  | MK812603   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Østfold, 2013, B.P. Løfall | O-L-187361 | OLICH1458-14 | MK812252   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Finnmark, 2014, S. Rui | O-L-195723 | OLICH1595-14 | KY266896   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Troms, 2014, E. Timdal | O-L-195777 | OLICH1649-14 | MK811972   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196311 | OLICH2241-15 | MK811652   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196339 | OLICH2277-15 | MK812419   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Svalbard, 2015, S. Rui | O-L-203283 | OLICH2702-16 | MK811681   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Hedmark, 2014, R. Haugan | O-L-207989 | OLICH3829-17 | MK812064   |           |
| *Flavocetraria nivalis*  | Lecanorales    | NO, Buskerud, 2015, E. Timdal & S. Rui | O-L-200902 | OLICH3837-17 | MK812356   |           |
| *Flavoparmelia soredians* | Lecanorales    | NO, Rogaland, 2013, E. Nygaard | BG-L-98015 | OLICH2437-16 | MK812200   |           |
| *Flavoplaca citrina*     | Teloschistales | NO, Nord-Trøndelag, 2015, V. Alstrup | O-L-201322 | OLICH2845-16 | MK811952   |           |
| Species                  | Order        | Voucher                  | Sample ID | Process ID   | GenBank ID   | Chemistry          |
|--------------------------|--------------|--------------------------|-----------|--------------|---------------|--------------------|
| *Flavoplaca citrina*     | Teloschistales | NO, Sør-Trøndelag, 2015, R. Haugan | O-L-204037 | OLICH3891-17 | MK812194      |                    |
| *Flavoplaca flavocitrina*| Teloschistales | NO, Hedmark, 2015, R. Haugan | O-L-204199 | OLICH3887-17 | MK811821      |                    |
| *Flavoplaca marina*      | Teloschistales | NO, Rogaland, 2010, J.T. Klepsland | O-L-200087 | OLICH3206-16 | MK811686      |                    |
| *Flavoplaca marina*      | Teloschistales | NO, Rogaland, 2014, J.T. Klepsland | O-L-200616 | OLICH3207-16 | MK811757      |                    |
| *Frutidella caesioatra*  | Lecanorales  | NO, Troms, 2014, J.T. Klepsland | O-L-200359 | OLICH3257-16 | MK812163      |                    |
| *Frutidella caesioatra*  | Lecanorales  | NO, Sogn og Fjordane, 2010, J.T. Klepsland | O-L-163395 | OLICH387-13 | MK811625      |                    |
| *Frutidella caesioatra*  | Lecanorales  | NO, Nordland, 2010, E. Timdal | O-L-163746 | OLICH388-13 | MK812446      |                    |
| *Frutidella caesioatra*  | Lecanorales  | NO, Nordland, 2010, E. Timdal | O-L-163752 | OLICH390-13 | MK812346      |                    |
| *Frutidella caesioatra*  | Lecanorales  | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184399 | OLICH657-13 | MK812561      |                    |
| *Fuscidea mollis*        | Umbilicariales | NO, Finnmark, 2014, M. Westberg | O-L-195707 | OLICH1579-14 | KY266980     | divaricatic acid   |
| *Fuscidea mollis*        | Umbilicariales | NO, Finnmark, 2014, E. Timdal | O-L-195917 | OLICH1762-14 | KY266834      | divaricatic acid   |
| Species                      | Order         | Voucher                     | Sample ID | Process ID | GenBank ID | Chemistry |
|-----------------------------|---------------|-----------------------------|-----------|------------|------------|-----------|
| *Fuscopannaria ahlneri*     | Peltigerales  | NO, Nordland, 2008, T.H. Hofton | O-L-186679 | OLICH2464-16 | MK812382   |           |
| *Fuscopannaria confusa*     | Peltigerales  | NO, Nordland, 2013, J.T. Klepsland | O-L-198017 | OLICH2465-16 | MK812003   |           |
| *Fuscopannaria ignobilis*   | Peltigerales  | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201286 | OLICH2675-16 | MK811940   |           |
| *Fuscopannaria ignobilis*   | Peltigerales  | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201281 | OLICH2778-16 | MK812023   |           |
| *Fuscopannaria ignobilis*   | Peltigerales  | NO, Sør-Trøndelag, 2015, H. Holien | TRH-L-16696 | OLICH3629-17 | MK812459   |           |
| *Fuscopannaria ignobilis*   | Peltigerales  | NO, Sør-Trøndelag, 2012, H. Fjeldstad | O-L-203080 | OLICH4062-17 | MK812103   |           |
| *Fuscopannaria mediterranea*| Peltigerales  | NO, Sogn og Fjordane, 2013, J.T. Klepsland | O-L-197869 | OLICH2096-15 | MK812182   |           |
| *Fuscopannaria mediterranea*| Peltigerales  | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199530 | OLICH3166-16 | MK811995   |           |
| *Fuscopannaria praetermissa*| Peltigerales  | NO, Telemark, 2014, E. Timdal | O-L-196265 | OLICH1940-15 | MK812190   |           |
| *Fuscopannaria praetermissa*| Peltigerales  | NO, Nordland, 2013, J.T. Klepsland | O-L-198031 | OLICH2097-15 | MK811734   |           |
| Species                  | Order         | Voucher              | Sample ID       | Process ID    | GenBank ID   | Chemistry |
|--------------------------|---------------|----------------------|-----------------|---------------|--------------|-----------|
| *Fuscopannaria praetermissa* | Peltigerales  | NO, Finnmark, 2003, E. Timdal | O-L-123194      | OLICH3883-17  | MK812710    |           |
| *Fuscopannaria praetermissa* | Peltigerales  | NO, Troms, 2009, J.T. Klepsland | O-L-174932      | OLICH3884-17  | MK811837    |           |
| *Gyalecta flotowii*      | Ostropales    | NO, Hordaland, 2013, J.B. Jordal | O-L-199472      | OLICH3165-16  | MK811791    |           |
| *Gyalecta flotowii*      | Ostropales    | NO, Sogn og Fjordane, 2013, H. Fjeldstad | O-L-203030      | OLICH4063-17  | MK811730    |           |
| *Gyalecta foveolaris*    | Ostropales    | NO, Finnmark, 2014, T.B. Wheeler | O-L-195735      | OLICH1607-14  | KY266833    |           |
| *Gyalecta friesii*       | Ostropales    | NO, Sør-Trøndelag, 2014, S. Vatne | O-L-200781      | OLICH2442-16  | MK812083    |           |
| *Gyalecta geoica*        | Ostropales    | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200544      | OLICH3164-16  | MK811956    |           |
| *Gyalecta jenensis*      | Ostropales    | NO, Finnmark, 2014, M. Westberg | O-L-195708      | OLICH1580-14  | KY266916    |           |
| *Gyalecta jenensis*      | Ostropales    | NO, Finnmark, 2014, A. Millanes | O-L-195860      | OLICH1705-14  | KY266964    |           |
| *Gyalecta jenensis*      | Ostropales    | NO, Nordland, 2013, J.T. Klepsland | O-L-198022      | OLICH4034-17  | MK811684    |           |
| *Gyalecta ulmi*          | Ostropales    | NO, Sør-Trøndelag, 2014, S. Vatne | O-L-200778      | OLICH2443-16  | MK812657    |           |
| Species             | Order            | Voucher                  | Sample ID | Process ID  | GenBank ID | Chemistry |
|---------------------|------------------|--------------------------|-----------|-------------|------------|-----------|
| *Gyalolechia*       | Teloschistales   | NO, Finnmark, 2011, E. Timdal | O-L-170861 | OLICH3215-16 | MK811756   |           |
| *bracteata*         |                  |                          |           |             |            |           |
|                     |                  | NO, Telemark, 2014, E. Timdal | O-L-195786 | OLICH1658-14 | MK811715   |           |
| *Gyalolechia*       | Teloschistales   | NO, Telemark, 2014, E. Timdal |           |             |            |           |
| *flavorubescens*    |                  |                          |           |             |            |           |
| *Gyrographa*        | Arthoniales      | NO, Nord-Trøndelag, 2015, H. Holien | TRH-L-16879 | OLICH3651-17 | MK812164   |           |
| *gyrocarpa*         |                  |                          |           |             |            |           |
|                     |                  | NO, Aust-Agder, 2015, J.T. Klepsland | O-L-204523 | OLICH4234-17 | MK812125   |           |
| *Haematomma*        | Lecanorales      | NO, Nordland, 2015, T. Tønsberg | BG-L-99143 | OLICH3704-17 | MK812424   |           |
| *ochroleucum*       |                  |                          |           |             |            |           |
|                     |                  | NO, Nordland, 2015, T. Tønsberg | BG-L-99181 | OLICH3749-17 | MK812361   |           |
| *Haematomma*        | Lecanorales      | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196048 | OLICH3817-17 | MK812222   |           |
| *ochroleucum*       |                  |                          |           |             |            |           |
|                     |                  | NO, Sør-Trøndelag, 2014, R. Haugan |           |             |            |           |
| *Halecania*         | Leprocaulales    | NO, Finnmark, 2014, M. Westberg | O-L-195847 | OLICH1692-14 | KY266832   |           |
| *alpivaga*          |                  |                          |           |             |            |           |
| *Hertelidea*        | Lecanorales      | NO, Hedmark, 2016, E. Timdal | O-L-201530 | OLICH3988-17 | MK811999   |           |
| *botryosa*          |                  |                          |           |             |            |           |
| *Hertelidea*        | Lecanorales      | NO, Sør-Trøndelag, 2007, E. Timdal | O-L-158480 | OLICH415-13  | MK812335   |           |
| *botryosa*          |                  |                          |           |             |            |           |
| *Heterodermia*      | Caliciales       | NO, Buskerud, 2009, T.H. Hofton | O-L-186983 | OLICH1454-14 | MK812396   |           |
| *speciosa*          |                  |                          |           |             |            |           |
| Species             | Order  | Voucher | Sample ID   | Process ID | GenBank ID | Chemistry |
|---------------------|--------|---------|-------------|------------|------------|-----------|
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176833 | OLICH2287-15 | MK812055 |          |
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176831 | OLICH2288-15 | MK812697 |          |
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176827 | OLICH2290-15 | MK812504 |          |
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176666 | OLICH2291-15 | MK812537 |          |
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176840 | OLICH2292-15 | MK812549 |          |
| *Heterodermia* speciosa | Caliciales | NO, Oppland, 2011, J.T. Klepsland | O-L-176824 | OLICH2293-15 | MK811755 |          |
| *Heterodermia* speciosa | Caliciales | NO, Hedmark, 2011, R. Haugan | O-L-173228 | OLICH2294-15 | MK812405 |          |
| *Hypocenomyce* scalaris | Umbilicariales | SE, Dalarna, 2014, E. Timdal | O-L-195692 | OLICH2014-15 | MK812269 |          |
| *Hypocenomyce* scalaris | Umbilicariales | NO, Telemark, 2013, J.T. Klepsland | O-L-198107 | OLICH2352-15 | MK811723 |          |
| *Hypocenomyce* scalaris | Umbilicariales | NO, Telemark, 2013, J.T. Klepsland | O-L-198111 | OLICH2366-15 | MK812170 |          |
| *Hypocenomyce* scalaris | Umbilicariales | NO, Hedmark, 2016, E. Timdal | O-L-201526 | OLICH3987-17 | MK811809 |          |
| *Hypocenomyce* scalaris | Umbilicariales | SE, Jämtland, 2017, E. Timdal | O-L-208182 | OLICH4285-17 | MK812211 |          |
| Species         | Order          | Voucher                          | Sample ID | Process ID | GenBank ID | Chemistry |
|-----------------|----------------|----------------------------------|-----------|------------|------------|-----------|
| *Hypogymnia* austerodes | Lecanorales    | NO, Hedmark, 2013, R. Haugan      | O-L-190094 | O-LICH1466-14 | MK812650  |           |
| *Hypogymnia* austerodes | Lecanorales    | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196349 | O-LICH1908-15 | MK812410  |           |
| *Hypogymnia* austerodes | Lecanorales    | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200537 | O-LICH2613-16 | MK812531  |           |
| *Hypogymnia* bitteri    | Lecanorales    | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184690 | O-LICH874-13 | MK811649  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Akershus, 2014, E. Timdal     | O-L-196258 | O-LICH2265-15 | MK811676  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Hedmark, 2010, R. Haugan      | O-L-183979 | O-LICH2279-15 | MK812081  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Hedmark, 2010, R. Haugan      | O-L-183983 | O-LICH2280-15 | MK812607  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Hedmark, 2010, R. Haugan      | O-L-183984 | O-LICH2281-15 | MK812314  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Hedmark, 2011, R. Haugan      | O-L-174340 | O-LICH2283-15 | MK812440  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Hedmark, 2010, R. Haugan      | O-L-183985 | O-LICH2285-15 | MK812305  |           |
| *Hypogymnia* farinacea  | Lecanorales    | NO, Buskerud, 2013, J.T. Klepsland | O-L-198103 | O-LICH2369-15 | MK812704  |           |
| Species                     | Order        | Voucher               | Sample ID   | Process ID   | GenBank ID | Chemistry                                                        |
|-----------------------------|-------------|-----------------------|-------------|--------------|------------|------------------------------------------------------------------|
| *Hypogymnia farinacea*      | Lecanorales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201310  | O-LICH2785-16 | MK811721   |                                                                 |
| *Hypogymnia hultenii*       | Lecanorales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201260  | O-LICH2767-16 | MK811640   |                                                                 |
| *Hypogymnia incurvoides*    | Lecanorales | NO, Rogaland, 2012, J.T. Klepsland | O-L-186120  | O-LICH1433-14 | MK811919   | atranorin, physodalic acid, physodic acid, protocetraric acid (minor) |
| *Hypogymnia incurvoides*    | Lecanorales | NO, Rogaland, 2012, J.T. Klepsland | O-L-186139  | O-LICH1435-14 | MK812392   | atranorin, physodalic acid, physodic acid, protocetraric acid (minor) |
| *Hypogymnia incurvoides*    | Lecanorales | NO, Nord-Trøndelag, 2014, J.T. Klepsland | O-L-200733  | O-LICH2620-16 | MK812655   | atranorin, physodalic acid, physodic acid                          |
| *Hypogymnia incurvoides*    | Lecanorales | NO, Hordaland, 2014, J.T. Klepsland | O-L-200683  | O-LICH3161-16 | MK812638   | atranorin, physodalic acid, physodic acid                          |
| *Hypogymnia physodes*       | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195888  | O-LICH1733-14 | KY266854   |                                                                 |
| *Hypogymnia physodes*       | Lecanorales | NO, Finnmark, 2014, M. Westberg | O-L-195921  | O-LICH1766-14 | KY266919   |                                                                 |
| *Hypogymnia physodes*       | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200883  | O-LICH2565-16 | MK811818   |                                                                 |
| Species       | Order        | Voucher                  | Sample ID   | Process ID   | GenBank ID   | Chemistry                                              |
|--------------|--------------|--------------------------|-------------|--------------|--------------|--------------------------------------------------------|
| Hypogymnia   | Lecanorales  | NO, Hordaland, 2014,     | O-L-200741  | OLICH2621-16 | MK812700     | 3-hydroxyphysodic acid, atranorin, physodalic acid,    |
| physodes     |              | J.T. Klepsland           |             |              |              | physodic acid                                          |
| Hypogymnia   | Lecanorales  | NO, Nord-Trøndelag,     | O-L-200731  | OLICH3158-16 | MK812007     | 3-hydroxyphysodic acid, atranorin, physodalic acid,    |
| physodes     |              | 2014, J.T. Klepsland     |             |              |              | physodic acid                                          |
| Hypogymnia   | Lecanorales  | NO, Nordland, 2014,     | O-L-200736  | OLICH3159-16 | MK812416     | 3-hydroxyphysodic acid, atranorin, physodalic acid,    |
| physodes     |              | J.T. Klepsland           |             |              |              | physodic acid                                          |
| Hypogymnia   | Lecanorales  | NO, Akershus, 2014,     | O-L-200255  | OLICH3160-16 | MK812648     |                                                        |
| physodes     |              | J.T. Klepsland           |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Buskerud, 2013,     | O-L-184691  | OLICH875-13  | MK812139     |                                                        |
| tubulosa     |              | S. Rui & E. Timdal       |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Telemark, 2014,     | O-L-194145  | OLICH1480-14 | MK811733     |                                                        |
| tubulosa     |              | S. Rui & E. Timdal       |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Rogaland, 2015,     | BG-L-98167  | OLICH3698-17 | MK812120     |                                                        |
| tubulosa     |              | T. Tønsberg & E. Nygaard |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Buskerud, 2013,     | O-L-184692  | OLICH876-13  | MK811664     |                                                        |
| tubulosa     |              | S. Rui & E. Timdal       |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Buskerud, 2008,     | O-L-155319  | OLICH1368-14 | MK811984     |                                                        |
| vittata      |              | G. Gaarder               |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Troms, 2014,        | O-L-195648  | OLICH1560-14 | MK812063     |                                                        |
| vittata      |              | E. Timdal                |             |              |              |                                                        |
| Hypogymnia   | Lecanorales  | NO, Telemark, 2015,     | O-L-200917  | OLICH2577-16 | MK812228     |                                                        |
| vittata      |              | S. Rui & E. Timdal       |             |              |              |                                                        |
| Species                    | Order       | Voucher                  | Sample ID   | Process ID | GenBank ID | Chemistry                                    |
|---------------------------|-------------|--------------------------|-------------|------------|------------|----------------------------------------------|
| *Hypogymnia vittata*      | Lecanorales | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200536  | OLICH2612-16 | MK812445 | atranorin, physodic acid, vittatolic acid    |
| *Hypogymnia vittata*      | Lecanorales | NO, Akershus, 2017, S. Rui & E. Timdal | O-L-206863  | OLICH4108-17 | MK812679 |                                            |
| *Hypotrachyna afrorevoluta*| Lecanorales | NO, Rogaland, 2011, J.T. Klepsland | O-L-176869  | OLICH2182-15 | MK812595 |                                            |
| *Hypotrachyna afrorevoluta*| Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-205001  | OLICH3991-17 | MK811750 |                                            |
| *Hypotrachyna laevigata*  | Lecanorales | NO, Rogaland, 2010, J.T. Klepsland | O-L-175129  | OLICH1391-14 | MK812534 |                                            |
| *Hypotrachyna laevigata*  | Lecanorales | NO, Rogaland, 2011, J.T. Klepsland | O-L-176890  | OLICH1397-14 | MK812711 |                                            |
| *Hypotrachyna revoluta*   | Lecanorales | NO, Rogaland, 2005, J.T. Klepsland | O-L-141145  | OLICH1352-14 | MK812078 |                                            |
| *Hypotrachyna revoluta*   | Lecanorales | NO, Vest-Agder, 2013, J.T. Klepsland | O-L-197837  | OLICH2099-15 | MK812441 |                                            |
| *Hypotrachyna revoluta*   | Lecanorales | NO, Rogaland, 2011, T. Høitomt | O-L-176684  | OLICH2183-15 | MK812141 |                                            |
| *Hypotrachyna revoluta*   | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-205002  | OLICH3990-17 | MK812580 |                                            |
| *Hypotrachyna sinuosa*    | Lecanorales | NO, Rogaland, 2016, T. Tønsberg | BG-L-99501  | OLICH3758-17 | MK812199 |                                            |
| *Icmadophila ericetorum*  | Pertusariales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184734  | OLICH1416-14 | MK812230 |                                            |
| Species              | Order         | Voucher       | Sample ID             | Process ID   | GenBank ID | Chemistry |
|----------------------|---------------|---------------|-----------------------|--------------|------------|-----------|
| Icmadophila ericetorum | Pertusariales | NO, Finnmark, 2014, E. Timdal | O-L-195557 | OLICH1515-14 | KY266881   |
| Icmadophila ericetorum | Pertusariales | NO, Finnmark, 2014, H. Holien | O-L-195756 | OLICH1628-14 | KY266943   |
| Icmadophila ericetorum | Pertusariales | NO, Finnmark, 2014, T. Tønsberg | O-L-195874 | OLICH1719-14 | KY266876   |
| Icmadophila ericetorum | Pertusariales | NO, Nord-Trøndelag, 2015, H. Holien | TRH-L-16544 | OLICH3627-17 | MK811879   |
| Imshaugia aleurites | Lecanorales    | NO, Akershus, 2014, E. Timdal | O-L-196257 | OLICH2264-15 | MK812672   |
| Japewia subaurifera | Lecanorales    | NO, Nord-Trøndelag, 2012, T. Tønsberg | BG-L-94252 | OLICH577-13 | MK812331   |
| Japewia subaurifera | Lecanorales    | NO, Finnmark, 2012, T. Tønsberg | BG-L-94707 | OLICH578-13 | MK812698   |
| Japewia subaurifera | Lecanorales    | NO, Nordland, 2012, T. Tønsberg | BG-L-94659 | OLICH596-13 | MK812623   |
| Japewia tomoensis   | Lecanorales    | NO, Buskerud, 2009, J.T. Klepsland | O-L-165163 | OLICH357-13 | MK812546   |
| Japewia tomoensis   | Lecanorales    | NO, Buskerud, 2011, J.T. Klepsland | O-L-176857 | OLICH358-13 | MK812668   |
| Koerberiella wimmeriana | Lecideales | NO, Hordaland, 2010, E. Timdal | O-L-163472 | OLICH414-13 | MK812168   |
| Species               | Order               | Voucher                      | Sample ID   | Process ID     | GenBank ID  | Chemistry          |
|-----------------------|---------------------|------------------------------|-------------|----------------|-------------|--------------------|
| *Lasallia pustulata*  | Umbilicariales      | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204990 | O-LICH4001-17 | MK811849    |                    |
| *Lecanactis abietina* | Arthoniales         | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200836 | O-LICH2424-16 | MK812703    |                    |
| *Lecanactis abietina* | Arthoniales         | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201261 | O-LICH2768-16 | MK811953    |                    |
| *Lecania aipospila*   | Lecanorales         | NO, Finnmark, 2014, J.T. Klepsland | O-L-200506 | O-LICH3254-16 | MK812577    |                    |
| *Lecania aipospila*   | Lecanorales         | NO, Finnmark, 2003, E. Timdal | O-L-123172 | O-LICH3962-17 | MK811636    |                    |
| *Lecania erysibe*     | Lecanorales         | NO, Oppland, 2011, J.T. Klepsland | O-L-183713 | O-LICH3956-17 | MK812191    |                    |
| *Lecanora atrosulphurea* | Lecanorales       | NO, Finnmark, 2014, E. Timdal | O-L-195558 | O-LICH1516-14 | KY266931    |                    |
| *Lecanora intricata*  | Lecanorales         | NO, Finnmark, 2014, U. Arup | O-L-195841 | O-LICH1686-14 | KY266891    |                    |
| *Lecanora intricata*  | Lecanorales         | NO, Finnmark, 2014, E. Timdal | O-L-195876 | O-LICH1721-14 | KY266975    |                    |
| *Lecanora leptacina*  | Lecanorales         | NO, Finnmark, 2014, E. Timdal | O-L-195896 | O-LICH1741-14 | KY266950    |                    |
| *Lecidea auriculata*  | Lecideales          | NO, Finnmark, 2014, E. Timdal | O-L-195916 | O-LICH1761-14 | KY266956    | no lichen substances |
| Species             | Order       | Voucher                     | Sample ID     | Process ID   | GenBank ID   | Chemistry                                |
|---------------------|-------------|-----------------------------|---------------|--------------|--------------|------------------------------------------|
| *Lecidea leucothallina* | Lecideales  | NO, Oppland, 2013, T. Tønsberg | BG-L-96170    | OLICH1065-14 | MG968256    | pannarin (thallus)                       |
| *Lecidea leucothallina* | Lecideales  | NO, Nordland, 2010, E. Timdal | O-L-163621    | OLICH179-11  | MG968259    | pannarin (apothecium), no lichen substances (thallus) |
| *Lecidea leucothallina* | Lecideales  | NO, Nordland, 2010, E. Timdal | O-L-163673    | OLICH180-11  | MG968258    | pannarin (thallus)                       |
| *Lecidea leucothallina* | Lecideales  | NO, Møre og Romsdal, 2010, R. Haugan | O-L-165815  | OLICH181-11  | MG968260    | no lichen substances (thallus)          |
| *Lecidea toensbergii* | Lecideales  | NO, Oppland, 2013, T. Tønsberg | BG-L-95936    | OLICH1010-13 | MG968261    | pannarin (thallus)                       |
| *Lecidea toensbergii* | Lecideales  | NO, Møre og Romsdal, 2010, R. Haugan | O-L-165806  | OLICH182-11  | MG968257    | pannarin (thallus)                       |
| *Leprocaulon quisquiliare* | Leprocaulales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200884  | OLICH2566-16 | MK812636    |                                          |
| *Leprocaulon quisquiliare* | Leprocaulales | NO, Akershus, 2015, S. Rui & E. Timdal | O-L-200816  | OLICH2587-16 | MK811899    |                                          |
| *Leprocaulon quisquiliare* | Leprocaulales | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208334  | OLICH4265-17 | MK812206    |                                          |
| *Leproplaca cirrochroa* | Teloschistales | NO, Oppland, 2011, J.T. Klepsland | O-L-183714  | OLICH4395-17 | MK812049    |                                          |
| *Leproplaca cirrochroa* | Teloschistales | NO, Telemark, 2009, R. Haugan & S. Reiso | O-L-160423  | OLICH4427-17 | MK812423    |                                          |
| Species               | Order               | Voucher               | Sample ID | Process ID   | GenBank ID | Chemistry                          |
|----------------------|---------------------|-----------------------|-----------|--------------|------------|-------------------------------------|
| Leproplaca cirrochroa| Teloschistales      | NO, Nord-Trøndelag, 1998, R. Haugan, R. Hollas | O-L-44774 | OLICH4428-17 | MK812709 | unknown acid, vulpinic acid         |
| Leproplaca obliterans| Teloschistales      | NO, Akershus, 2013, J.T. Klepsland | O-L-197812 | OLICH4426-17 | MK812503 |                                     |
| Leptogium cochleatum | Peltigerales        | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199489 | OLICH3149-16 | MK812473 |                                     |
| Leptogium cochleatum | Peltigerales        | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199545 | OLICH3150-16 | MK811946 |                                     |
| Leptogium saturninum | Peltigerales        | NO, Finnmark, 2014, E. Timdal | O-L-195592 | OLICH1533-14 | MK812662 |                                     |
| Leptogium saturninum | Peltigerales        | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199516 | OLICH3250-16 | MK812179 |                                     |
| Leptogium saturninum | Peltigerales        | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196046 | OLICH3800-17 | MK811641 |                                     |
| Letharia vulpina     | Lecanorales         | NO, Hedmark, 2012, R. Haugan | O-L-184032 | OLICH1405-14 | MK812266 | unknown acid, vulpinic acid         |
| Letharia vulpina     | Lecanorales         | NO, Hedmark, 2012, R. Haugan | O-L-184029 | OLICH2179-15 | MK812109 |                                     |
| Letharia vulpina     | Lecanorales         | NO, Hedmark, 2011, B. Skinderhaug | O-L-169053 | OLICH2180-15 | MK811718 |                                     |
| Species               | Order              | Voucher                  | Sample ID | Process ID  | GenBank ID | Chemistry |
|----------------------|--------------------|--------------------------|-----------|-------------|------------|-----------|
| *Letharia vulpina*   | Lecanorales        | NO, Hedmark, 2010, R. Haugan | O-L-165378 | OLICH2181-15 | MK811860   |           |
| *Letharia vulpina*   | Lecanorales        | NO, Hedmark, 2014, R. Haugan | O-L-198890 | OLICH2395-16 | MK811758   |           |
| *Lichenomphalia alpina* | Agaricales      | NO, Finnmark, 2014, H. Holien | O-L-195732 | OLICH1604-14 | KY266895   |           |
| *Lichenomphalia velutina* | Agaricales   | NO, Oslo, 2014, E. Timdal | O-L-200004 | OLICH1978-15 | MK811822   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Sør-Trøndelag, 2010, J.T. Klepsland | O-L-196021 | OLICH1866-14 | MK812432   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-174993 | OLICH2176-15 | MK812486   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Sør-Trøndelag, 2013, J.T. Klepsland | O-L-198062 | OLICH2326-15 | MK811832   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Buskerud, 2011, T.H. Hofton | O-L-194379 | OLICH2327-15 | MK811802   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Sogn og Fjordane, 2010, T.H. Hofton | O-L-187118 | OLICH2328-15 | MK812689   |           |
| *Lobaria amplissima* | Peltigerales       | NO, Sør-Trøndelag, 2011, J.T. Klepsland | O-L-176912 | OLICH2329-15 | MK812498   |           |
| Species          | Order         | Voucher           | Sample ID   | Process ID       | GenBank ID | Chemistry |
|------------------|--------------|-------------------|-------------|------------------|------------|-----------|
| *Lobaria amplissima* | Peltigerales | NO, Nord-Trøndelag, 2012, J.T. Klepsland | O-L-186329  | OLICH2330-15     | MK811725   |           |
| *Lobaria amplissima* | Peltigerales | NO, Nord-Trøndelag, 2013, J.T. Klepsland | O-L-198158  | OLICH2387-16     | MK812569   |           |
| *Lobaria amplissima* | Peltigerales | NO, Nordland, 2003, A. Granmo & L. Molster | TROM_L_46394 | OLICH3586-17     | MK811901   |           |
| *Lobaria linita*   | Peltigerales | NO, Finnmark, 2014, E. Timdal | O-L-195728  | OLICH1600-14     | KY266856   |           |
| *Lobaria linita*   | Peltigerales | NO, Finnmark, 2014, E. Timdal | O-L-195892  | OLICH1737-14     | KY266932   |           |
| *Lobaria pulmonaria* | Peltigerales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196024  | OLICH1869-14     | MK811957   |           |
| *Lobaria pulmonaria* | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196356  | OLICH1915-15     | MK811682   |           |
| *Lobaria pulmonaria* | Peltigerales | NO, Østfold, 2013, O. Wergeland Krog | O-L-193007  | OLICH2335-15     | MK812447   |           |
| *Lobaria pulmonaria* | Peltigerales | NO, Østfold, 2012, O. Wergeland Krog et al. | O-L-193009  | OLICH2336-15     | MK812330   |           |
| *Lobaria pulmonaria* | Peltigerales | NO, Østfold, 2013, O. Wergeland Krog | O-L-193011  | OLICH2337-15     | MK812533   |           |
| Species         | Order         | Voucher                      | Sample ID | Process ID   | GenBank ID | Chemistry |
|-----------------|---------------|------------------------------|-----------|--------------|------------|-----------|
| *Lobaria* pulmonaria | Peltigerales  | NO, Hedmark, 2013, R. Haugan | O-L-190366 | OLICH2338-15 | MK812202   |           |
| *Lobaria* pulmonaria | Peltigerales  | NO, Buskerud, 2011, T.H. Hofton & S. Reiso | O-L-194285 | OLICH2339-15 | MK812005   |           |
| *Lobaria* pulmonaria | Peltigerales  | NO, Buskerud, 2012, T.H. Hofton | O-L-194456 | OLICH2340-15 | MK812631   |           |
| *Lobaria* pulmonaria | Peltigerales  | NO, Vest-Agder, 2011, J.T. Klepsland | O-L-177093 | OLICH2346-15 | MK812031   |           |
| *Lobaria* pulmonaria | Peltigerales  | NO, Hedmark, 2012, R. Haugan | O-L-183966 | OLICH2347-15 | MK812039   |           |
| *Lobaria* pulmonaria | Peltigerales  | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200863 | OLICH2515-16 | MK811954   |           |
| *Lobaria* pulmonaria | Peltigerales  | NO, Troms, 2005, A. Granmo | TROM_L_50934 | OLICH3536-17 | MK811932   |           |
| *Lobaria* scrobiculata | Peltigerales  | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196350 | OLICH1909-15 | MK812570   |           |
| *Lobaria* scrobiculata | Peltigerales  | NO, Østfold, 2013, B.P. Løfall & O. Wergeland Krog | O-L-187365 | OLICH2341-15 | MK812073   |           |
| *Lobaria* scrobiculata | Peltigerales  | NO, Hedmark, 2013, R. Haugan | O-L-190098 | OLICH2342-15 | MK812310   |           |
| Species              | Order        | Voucher                              | Sample ID      | Process ID   | GenBank ID | Chemistry |
|----------------------|--------------|--------------------------------------|----------------|--------------|------------|-----------|
| Lobaria scrobiculata | Peltigerales | NO, Buskerud, 2012, T.H. Hofton      | O-L-194516     | OLICH2343-15 | MK812214   |           |
| Lobaria scrobiculata | Peltigerales | NO, Rogaland, 2012, J.T. Klepsland   | O-L-186129     | OLICH2344-15 | MK811651   |           |
| Lobaria scrobiculata | Peltigerales | NO, Nord-Trøndelag, 2010, H. Bratli | O-L-168086     | OLICH2345-15 | MK812309   |           |
| Lobaria scrobiculata | Peltigerales | NO, Troms, 2005, A. Granmo           | TROM_L_50935   | OLICH3537-17 | MK812074   |           |
| Lobaria scrobiculata | Peltigerales | NO, Sør-Trøndelag, 2014, R. Haugan  | O-L-196051     | OLICH3810-17 | MK811855   |           |
| Lobaria virens       | Peltigerales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201271     | OLICH2774-16 | MK811660   |           |
| Lobaria virens       | Peltigerales | NO, Nordland, 2014, J.T. Klepsland   | O-L-200346     | OLICH3249-16 | MK811736   |           |
| Lobaria virens       | Peltigerales | NO, Vestfold, 2003, T.H. Hofton et al. | O-L-128546     | OLICH4103-17 | MK812046   |           |
| Lobothallia alphoplaca | Pertusariales | NO, Finnmark, 2014, J.T. Klepsland | O-L-200411     | OLICH2658-16 | MK812484   |           |
| Lobothallia melanaspis | Pertusariales | SE, Torne Lappmark, 2014, E. Timdal | O-L-195680     | OLICH2007-15 | MK811796   |           |
| Lobothallia melanaspis | Pertusariales | NO, Hedmark, 2014, R. Haugan        | O-L-198879     | OLICH2390-16 | MK811944   |           |
| Species             | Order         | Voucher         | Sample ID | Process ID      | GenBank ID | Chemistry |
|---------------------|---------------|-----------------|-----------|-----------------|------------|-----------|
| *Loxospora elatina* | Sarrameanales | NO, Nord-Trøndelag, 2014, J.T. Klepsland | O-L-200270 | OLICH2657-16    | MK812411   |           |
| *Massalongia carnosa* | Peltigerales | NO, Aust-Agder, 2013, J.T. Klepsland | O-L-198320 | OLICH2371-15    | MK812187   |           |
| *Massalongia carnosa* | Peltigerales | NO, Buskerud, 2011, E. Timdal | O-L-175425 | OLICH3285-16    | MK811716   |           |
| *Megalaria grossa*  | Lecanorales   | NO, Akershus, 2010, J.T. Klepsland | O-L-174947 | OLICH1036-13    | MK811839   |           |
| *Megalaria grossa*  | Lecanorales   | NO, Sør-Trøndelag, 2005, E. Timdal | O-L-149362 | OLICH1039-13    | MK812151   |           |
| *Megalaria grossa*  | Lecanorales   | NO, Nordland, 2014, J.T. Klepsland | O-L-200308 | OLICH2656-16    | MK812492   |           |
| *Megalaria pulvere* | Lecanorales   | NO, Sogn og Fjordane, 2009, J.T. Klepsland | O-L-165033 | OLICH1033-13    | MK812535   |           |
| *Megalaria pulvere* | Lecanorales   | NO, Sør-Trøndelag, 2009, R. Haugan | O-L-167026 | OLICH1034-13    | MK812297   |           |
| *Megalaria pulvere* | Lecanorales   | NO, Nord-Trøndelag, 2008, J.T. Klepsland | O-L-158214 | OLICH1035-13    | MK812205   |           |
| *Megalaria pulvere* | Lecanorales   | NO, Hordaland, 2011, J.T. Klepsland | O-L-176983 | OLICH1317-14    | MK812565   |           |
| Species                  | Order       | Voucher       | Sample ID   | Process ID    | GenBank ID  | Chemistry |
|-------------------------|-------------|---------------|-------------|---------------|-------------|-----------|
| *Megalaria pulverea*    | Lecanorales | NO, Nordland, 2013, J.T. Klepsland | O-L-197986 | OLICH2104-15 | MK812321    |           |
| *Melanelia agnata*      | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196376 | OLICH1935-15 | MK812394    |           |
| *Melanelia hepatizon*   | Lecanorales | NO, Hordaland, 2014, E. Timdal         | O-L-195807 | OLICH1679-14 | MK812512    |           |
| *Melanelia hepatizon*   | Lecanorales | NO, Finnmark, 2014, M. Westberg        | O-L-195864 | OLICH1709-14 | KY266879    |           |
| *Melanelia hepatizon*   | Lecanorales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201254 | OLICH2762-16 | MK812070    |           |
| *Melanelia hepatizon*   | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184723 | OLICH939-13 | MK812188    |           |
| *Melanelia stygia*      | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184736 | OLICH1418-14 | MK812608    |           |
| *Melanelia stygia*      | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal     | O-L-196377 | OLICH1936-15 | MK812312    |           |
| *Melanelixia fuliginosa*| Lecanorales | NO, Vestfold, 2015, E. Timdal          | O-L-198943 | OLICH2499-16 | MK812485    |           |
| *Melanelixia fuliginosa*| Lecanorales | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200866 | OLICH2518-16 | MK812619    |           |
| Species             | Order          | Voucher                  | Sample ID  | Process ID         | GenBank ID | Chemistry |
|---------------------|----------------|--------------------------|------------|--------------------|------------|-----------|
| *Melanelixia*       | Lecanorales    | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196050 | OLICH3818-17       | MK812455   |           |
| *fuliginosa*        |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Hordaland, 2011, J.T. Klepsland | O-L-176965 | OLICH4122-17       | MK812674   |           |
| *glabratula*        |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Buskerud, 2014, E. Timdal | O-L-200810 | OLICH2475-16       | MK812517   |           |
| *subargentifera*    |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Hedmark, 2015, E. Timdal | O-L-200854 | OLICH2505-16       | MK812491   |           |
| *subargentifera*    |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200867 | OLICH2519-16       | MK811964   |           |
| *subargentifera*    |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Hedmark, 2014, R. Haugan | O-L-207985 | OLICH3820-17       | MK812324   |           |
| *subaurifera*       |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195997 | OLICH1842-14       | MK811631   |           |
| *subaurifera*       |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Akershus, 2014, E. Timdal | O-L-199993 | OLICH1967-15       | MK811942   |           |
| *subaurifera*       |                |                          |            |                    |            |           |
| *Melanelixia*       | Lecanorales    | NO, Oslo, 2014, E. Timdal | O-L-198930 | OLICH2483-16       | MK812688   |           |
| *subaurifera*       |                |                          |            |                    |            |           |
| *Melanohalea*       | Lecanorales    | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196008 | OLICH1853-14       | MK812395   |           |
| *exasperata*        |                |                          |            |                    |            |           |
| Species               | Order         | Voucher                  | Sample ID    | Process ID     | GenBank ID | Chemistry |
|----------------------|---------------|--------------------------|--------------|----------------|------------|-----------|
| *Melanohalea exasperata* | Lecanorales   | NO, Telemark, 2015, E. Timdal | O-L-208004   | OLICH3878-17  | MK812307   |           |
| *Melanohalea exasperata* | Lecanorales   | NO, Sogn og Fjordane, 2004, A. Breili | O-L-151072   | OLICH4123-17  | MK812184   |           |
| *Melanohalea infumata*   | Lecanorales   | NO, Troms, 2003, E. Timdal | O-L-123135   | OLICH4126-17  | MK812651   |           |
| *Melanohalea olivacea*   | Lecanorales   | NO, Finnmark, 2014, E. Timdal | O-L-195933   | OLICH1778-14  | KY266962   |           |
| *Melanohalea olivacea*   | Lecanorales   | NO, Buskerud, 2014, E. Timdal | O-L-195826   | OLICH2198-15  | MK812054   |           |
| *Melanohalea olivacea*   | Lecanorales   | NO, Telemark, 2015, E. Timdal | O-L-208005   | OLICH3879-17  | MK812340   |           |
| *Melanohalea septentrionalis* | Lecanorales   | NO, Akershus, 2017, S. Rui & E. Timdal | O-L-206865   | OLICH4110-17  | MK812433   |           |
| *Menegazzia subsimilis*  | Lecanorales   | NO, Rogaland, 2007, E. Timdal | O-L-149092   | OLICH864-13   | MK812421   |           |
| *Menegazzia subsimilis*  | Lecanorales   | NO, Rogaland, 2012, J.T. Klepsland | O-L-186134   | OLICH944-13   | MK812020   |           |
| *Menegazzia terebrata*   | Lecanorales   | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200861   | OLICH2513-16  | MK812093   |           |
| *Menegazzia terebrata*   | Lecanorales   | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200924   | OLICH2532-16  | MK812635   |           |
| Species         | Order      | Voucher          | Sample ID       | Process ID     | GenBank ID | Chemistry               |
|-----------------|------------|------------------|-----------------|----------------|------------|-------------------------|
| *Menegazzia* terebrata | Lecanorales | NO, Hordaland, 2013, T. Tønsberg | BG-L-95692     | OLICH858-13   | MK812654   |                         |
| *Menegazzia* terebrata | Lecanorales | NO, Oppland, 2011, J.T. Klepsland | O-L-176828     | OLICH861-13   | MK812025   |                         |
| *Menegazzia* terebrata | Lecanorales | NO, Rogaland, 2012, J.T. Klepsland | O-L-186132     | OLICH949-13   | MK812145   |                         |
| *Micarea* botryoides | Lecanorales | NO, Rogaland, 2013, J.I. Johnsen | BG-L-95780     | OLICH1006-13  | MK812289   |                         |
| *Micarea* denigrata | Lecanorales | NO, Oppland, 2011, R. Haugan & A.M. Haugan | O-L-174438     | OLICH1013-13  | MK811696   |                         |
| *Micarea* misella | Lecanorales | NO, Nord-Trøndelag, 2013, H. Holien | TRH-L-15146    | OLICH990-13   | MK812399   |                         |
| *Micarea* paratropa | Lecanorales | NO, Sør-Trøndelag, 2010, R. Haugan | O-L-165711     | OLICH101-11   | MK812318   | no lichen substances    |
| *Montanelia* disjuncta | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195590     | OLICH1531-14  | MK811852   |                         |
| *Montanelia* disjuncta | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196357     | OLICH1916-15  | MK811711   |                         |
| *Montanelia* disjuncta | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-198675     | OLICH2404-16  | KY266910   |                         |
| *Montanelia* panniformis | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195904     | OLICH1749-14  | KY266847   |                         |
| Species            | Order     | Voucher               | Sample ID   | Process ID | GenBank ID | Chemistry        |
|--------------------|-----------|-----------------------|-------------|------------|------------|------------------|
| Montanelia panniformis | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200016  | OLICH1990-15 | MK812407    |                  |
| Montanelia panniformis | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200878  | OLICH2535-16 | MK812634    |                  |
| Montanelia panniformis | Lecanorales | NO, Oppland, 2015, E. Timdal | O-L-201338  | OLICH2722-16 | MK812263    |                  |
| Montanelia sorediata | Lecanorales | NO, Telemark, 2014, E. Timdal | O-L-195791  | OLICH1663-14 | MK811963    |                  |
| Montanelia sorediata | Lecanorales | NO, Troms, 2014, E. Timdal | O-L-195658  | OLICH1998-15 | MK811965    |                  |
| Montanelia sorediata | Lecanorales | NO, Buskerud, 2016, M. Stapnes Dahl et al. | O-L-204941  | OLICH4115-17 | MK811977    |                  |
| Montanelia tominii  | Lecanorales | NO, Oppland, 2015, E. Timdal | O-L-201344  | OLICH2728-16 | MK812373    |                  |
| Mycobilimbia berengeriana | Lecideales | NO, Aust-Agder, 2011, J.T. Klepsland | O-L-177070  | OLICH1113-14 | MK812040    |                  |
| Mycobilimbia berengeriana | Lecideales | NO, Oppland, 2011, J.T. Klepsland | O-L-176838  | OLICH1114-14 | MK812343    |                  |
| Mycobilimbia berengeriana | Lecideales | NO, Finnmark, 2011, E. Timdal | O-L-170554  | OLICH1117-14 | MK811751    | no lichen substances |
| Mycobilimbia berengeriana | Lecideales | NO, Aust-Agder, 2009, J.T. Klepsland | O-L-167344  | OLICH1170-14 | MK811880    |                  |
| Mycobilimbia berengeriana | Lecideales | NO, Finnmark, 2014, E. Llop Vallverdu | O-L-195696  | OLICH1568-14 | KY266871    |                  |
| Species               | Order    | Voucher            | Sample ID | Process ID       | GenBank ID  | Chemistry               |
|----------------------|----------|--------------------|-----------|------------------|-------------|-------------------------|
| *Mycobilimbia*       | Lecideales | NO, Sør-Trøndelag, 2004, R. Haugan | O-L-142068 | OLICH629-13      | MK811889    |                         |
| *berengeriana*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Telemark, 2010, J.T. Klepsland | O-L-175294 | OLICH1109-14     | MK812353    |                         |
| *carneoalbida*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Aust-Agder, 2005, J.T. Klepsland | O-L-151121 | OLICH1120-14     | MK811646    |                         |
| *carneoalbida*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Troms, 2009, J.T. Klepsland | O-L-164904 | OLICH1121-14     | MK812149    |                         |
| *carneoalbida*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Oppland, 2011, R. Haugan | O-L-174298 | OLICH1122-14     | MK812290    |                         |
| *carneoalbida*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Hedmark, 2011, R. Haugan | O-L-174282 | OLICH1123-14     | MK812691    |                         |
| *carneoalbida*       |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Telemark, 2007, E. Timdal | O-L-149057 | OLICH1124-14     | MK812639    |                         |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Hedmark, 2006, J.T. Klepsland | O-L-164598 | OLICH1105-14     | MK812105    |                         |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Aust-Agder, 2006, J.T. Klepsland | O-L-151124 | OLICH1106-14     | MK812388    |                         |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Troms, 2007, J.T. Klepsland | O-L-154903 | OLICH1107-14     | MK812645    |                         |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Telemark, 2007, E. Timdal | O-L-149055 | OLICH1108-14     | MK812402    | no lichen substances    |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| *Mycobilimbia*       | Lecideales | NO, Akershus, 2000, R. Haugan | O-L-160303 | OLICH1112-14     | MK811772    |                         |
| *epixanthoides*      |          |                    |           |                  |             |                         |
| Species             | Order    | Voucher          | Sample ID   | Process ID     | GenBank ID | Chemistry       |
|---------------------|----------|------------------|-------------|----------------|------------|-----------------|
| *Mycobilimbia*      | Lecideales | NO, Vest-Agder, 2009, J.T. Klepsland | O-L-164694 | O-LICH1110-14 | MK812275   |                 |
| *pilularis*         |          |                  |             |                |            |                 |
|                     |          | NO, Møre og Romsdal, 2012, B. Nordén & J.B. Jordal | O-L-180158 | O-LICH1111-14 | MK812666   |                 |
|                     |          |                  |             |                |            |                 |
|                     |          | NO, Hordaland, 2008, J.B. Jordal | O-L-176020 | O-LICH1125-14 | MK812525   |                 |
| *Mycobilimbia*      | Lecideales | NO, Sogn og Fjordane, 2009, A. Breili | O-L-159489 | O-LICH1126-14 | MK812665   |                 |
| *pilularis*         |          |                  |             |                |            |                 |
|                     |          | NO, Finnmark, 2011, E. Timdal | O-L-170621 | O-LICH1119-14 | MK812422   | no lichen substances |
| *Mycobilimbia*      | Lecideales | NO, Nordland, 2011, R. Haugan | O-L-174132 | O-LICH1127-14 | MK812216   | no lichen substances |
| *tetramera*         |          |                  |             |                |            |                 |
|                     |          | NO, Aust-Agder, 2006, J.T. Klepsland | O-L-183493 | O-LICH1128-14 | MK811935   |                 |
| *Mycobilimbia*      | Lecideales | NO, Finnmark, 2014, E. Llop Vallverdu | O-L-195846 | O-LICH1691-14 | MK812124   |                 |
| *tetramera*         |          |                  |             |                |            |                 |
|                     |          | NO, Akershus, 2014, J.T. Klepsland | O-L-200258 | O-LICH3147-16 | MK812192   |                 |
| *Mycobilimbia*      | Lecideales | NO, Akershus, 2009, J.T. Klepsland | O-L-164634 | O-LICH631-13  | MK812158   |                 |
| *tetramera*         |          |                  |             |                |            |                 |
|                     |          | NO, Hedmark, 2008, R. Haugan | O-L-160476 | O-LICH633-13  | MK812208   |                 |
| Species                  | Order          | Voucher | Sample ID | Process ID | GenBank ID | Chemistry |
|-------------------------|----------------|---------|-----------|------------|------------|-----------|
| *Mycoblastus sanguinarius* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195768 | OLICH1640-14 | MK812482 |           |
| *Mycoblastus sanguinarius* | Lecanorales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201263 | OLICH2769-16 | MK811859 |           |
| *Mycoblastus sanguinarius* | Lecanorales | NO, Hedmark, 2010, E. Timdal | O-L-163524 | OLICH391-13 | MK811665 |           |
| *Mycoblastus sanguinarius* | Lecanorales | NO, Telemark, 2005, E. Timdal | O-L-138597 | OLICH410-13 | MK812197 |           |
| *Mycoblastus sanguinarius* | Lecanorales | NO, Oppland, 2006, A. Breili | O-L-150999 | OLICH617-13 | MK812135 |           |
| *Myriolecis straminea*    | Lecanorales | NO, Finnmark, 2014, M. Westberg | O-L-195870 | OLICH1715-14 | KY266929 |           |
| *Myriospora smaragdula*   | Acarosporales | NO, Finnmark, 2014, E. Timdal | O-L-195609 | OLICH1543-14 | MK811918 |           |
| *Nephroma arcticum*      | Peltigerales | NO, Troms, 2014, E. Timdal | O-L-195654 | OLICH1566-14 | MK811882 |           |
| *Nephroma arcticum*      | Peltigerales | NO, Finnmark, 2014, S. Rui | O-L-195724 | OLICH1596-14 | KY266888 |           |
| *Nephroma arcticum*      | Peltigerales | NO, Finnmark, 2014, A. Millanes | O-L-195873 | OLICH1718-14 | KY266963 |           |
| *Nephroma arcticum*      | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196368 | OLICH1927-15 | MK812091 |           |
| *Nephroma arcticum*      | Peltigerales | NO, Telemark, 2014, E. Timdal | O-L-196272 | OLICH1945-15 | MK812336 |           |
| Species         | Order     | Voucher                  | Sample ID | Process ID | GenBank ID | Chemistry   |
|-----------------|-----------|--------------------------|-----------|------------|------------|-------------|
| *Nephroma arcticum* | Peltigerales | NO, Nord-Trøndelag, 2014, Z. Fackovcova et al. | SAV-36    | OLICH3073-16 | MK812204   | triterpenoids |
| *Nephroma arcticum* | Peltigerales | NO, Nord-Trøndelag, 2014, Z. Fackovcova et al. | SAV-37    | OLICH3074-16 | MK812592   | triterpenoids |
| *Nephroma arcticum* | Peltigerales | NO, Finnmark, 2008, A. Granmo & G. Mathiassen | TROM_L_46162 | OLICH3570-17 | MK811792   | triterpenoids |
| *Nephroma arcticum* | Peltigerales | NO, Hedmark, 2014, R. Haugan | O-L-207992 | OLICH3828-17 | MK812028   | triterpenoids |
| *Nephroma bellum*   | Peltigerales | NO, Nord-Trøndelag, 2014, H. Bratli | O-L-168043 | OLICH2027-15 | MK811672   | triterpenoids |
| *Nephroma bellum*   | Peltigerales | NO, Sogn og Fjordane, 2012, O. Roen | O-L-181644 | OLICH2028-15 | MK812308   | triterpenoids |
| *Nephroma bellum*   | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196348 | OLICH2373-15 | MK812483   | triterpenoids |
| *Nephroma expallidum* | Peltigerales | NO, Finnmark, 2014, M. Westberg | O-L-195701 | OLICH1573-14 | KY266905   | triterpenoids |
| *Nephroma expallidum* | Peltigerales | NO, Finnmark, 2014, E. Timdal | O-L-195891 | OLICH1736-14 | KY266844   | triterpenoids |
| *Nephroma expallidum* | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196346 | OLICH1906-15 | MK812408   | triterpenoids |
| Species       | Order       | Voucher              | Sample ID   | Process ID   | GenBank ID | Chemistry                  |
|--------------|-------------|----------------------|-------------|--------------|------------|----------------------------|
| Nephroma expallidum | Peltigerales | NO, Finnmark, 2011, E. Timdal | O-L-170548 | OLICH2365-15 | MK811945   |                            |
| Nephroma expallidum | Peltigerales | NO, Svalbard, 2015, S. Rui | O-L-203292 | OLICH2712-16 | MK812041   |                            |
| Nephroma helveticum | Peltigerales | NO, Buskerud, 2013, T.H. Hofton | O-L-196491 | OLICH2036-15 | KT800007   | triterpenoids               |
| Nephroma helveticum | Peltigerales | NO, Oppland, 2011, J.T. Klepsland | O-L-181601 | OLICH2037-15 | KT800006   | triterpenoides (T4, T1)     |
| Nephroma laevigatum | Peltigerales | NO, Nord-Trøndelag, 2010, H. Bratli | O-L-168088 | OLICH2025-15 | MK812687   |                            |
| Nephroma laevigatum | Peltigerales | NO, Sogn og Fjordane, 2010, J.T. Klepsland | O-L-175024 | OLICH2038-15 | MK812108   | pigments, triterpenoid      |
| Nephroma laevigatum | Peltigerales | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201288 | OLICH2676-16 | MK812261   |                            |
| Nephroma laevigatum | Peltigerales | NO, Troms, 2010, K. Wannebo Nilsen | TROM_L_48759 | OLICH3531-17 | MK811868   |                            |
| Nephroma laevigatum | Peltigerales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196055 | OLICH3812-17 | MK811969   |                            |
| Nephroma laevigatum | Peltigerales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204997 | OLICH4002-17 | MK812002   |                            |
| Nephroma parile | Peltigerales | NO, Finnmark, 2014, T. Tønsberg | O-L-195875 | OLICH1720-14 | KY266927   | triterpenoids               |
| Species       | Order         | Voucher                  | Sample ID  | Process ID     | GenBank ID | Chemistry                      |
|--------------|---------------|--------------------------|------------|----------------|------------|--------------------------------|
| Nephroma resupinatum | Peltigerales  | NO, Hedmark, 2013, R. Haugan | O-L-190528 | OLICH2020-15 | MK811650   |                                |
| Nephroma resupinatum | Peltigerales  | NO, Sogn og Fjordane, 2010, E. Timdal | O-L-163401 | OLICH2022-15 | MK812367   |                                |
| Nephroma resupinatum | Peltigerales  | NO, Troms, 2011, J.T. Klepsland | O-L-177168 | OLICH2023-15 | MK812612   |                                |
| Nephroma resupinatum | Peltigerales  | NO, Nord-Trøndelag, 2011, J.T. Klepsland | O-L-183598 | OLICH2024-15 | MK811912   | no lichen substances          |
| Nephroma resupinatum | Peltigerales  | NO, Troms, 2005, A. Granmo | TROM_L_50937 | OLICH3538-17 | MK812301   |                                |
| Nephroma resupinatum | Peltigerales  | NO, Finnmark, 2008, A. Granmo & G. Mathiassen | TROM_L_48235 | OLICH3588-17 | MK812553   |                                |
| Nephroma tangeriense | Peltigerales  | NO, Hordaland, 2012, J.T. Klepsland | O-L-186150 | OLICH2018-15 | MK811986   | pigments, triterpenoids (T3, T4, T6) |
| Nephroma tangeriense | Peltigerales  | NO, Rogaland, 2010, J.T. Klepsland | O-L-181602 | OLICH2019-15 | MK812084   | pigments, triterpenoids (T2, T3, T6) |
| Nephroma tangeriense | Peltigerales  | NO, Vest-Agder, 2011, J.T. Klepsland | O-L-183599 | OLICH2039-15 | MK812530   | pigments, triterpenoids         |
| Nephroma tangeriense | Peltigerales  | NO, Vest-Agder, 2013, J.T. Klepsland | O-L-197824 | OLICH2105-15 | MK812579   | pigments                       |
| Nephroma tangeriense | Peltigerales  | NO, Vest-Agder, 2013, J.T. Klepsland | O-L-197826 | OLICH2106-15 | MK812593   |                                |
| Species                  | Order            | Voucher                | Sample ID | Process ID     | GenBank ID | Chemistry                                      |
|-------------------------|------------------|------------------------|-----------|----------------|------------|------------------------------------------------|
| Nevesia sampaiana       | Peltigerales     | NO, Sogn og Fjordane, 2009, H. Fjeldstad | O-L-203003 | OLICH3277-16   | MK812089   |                                                |
| Normandina pulchella    | Verrucariales    | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204993 | OLICH4003-17   | MK812131   |                                                |
| Ochrolechia alaskana    | Pertusariales    | NO, Finnmark, 2008, A. Granmo & G. Mathiassen | TROM_L_60552 | OLICH3582-17   | MK811874   |                                                |
| Ochrolechia alboflavescens | Pertusariales | NO, Nord-Trøndelag, 2015, F. Jonsson | O-L-201276 | OLICH3230-16   | MK812244   |                                                |
| Ochrolechia androgyna   | Pertusariales    | NO, Nord-Trøndelag, 2015, H. Holien | TRH-L-16947 | OLICH3684-17   | MK812264   |                                                |
| Ochrolechia androgyna   | Pertusariales    | NO, Oppland, 2015, R. Haugan | O-L-203919 | OLICH3885-17   | MK811897   | atranorin, gyrophoric acid, lecanoric acid, unknown acid |
| Ochrolechia androgyna   | Pertusariales    | NO, Oppland, 2015, E. Timdal | O-L-201397 | OLICH4178-17   | MK812682   | gyrophoric acid                                 |
| Ochrolechia frigida     | Pertusariales    | NO, Finnmark, 2014, A. Launis | O-L-195945 | OLICH1790-14   | KY266952   |                                                |
| Ochrolechia gowardii    | Pertusariales    | NO, Nord-Trøndelag, 2014, J.T. Klepsland | O-L-200283 | OLICH3146-16   | MK812101   |                                                |
| Ochrolechia gowardii    | Pertusariales    | NO, Nord-Trøndelag, 2012, J.T. Klepsland | O-L-200100 | OLICH3225-16   | MK812175   |                                                |
| Species                  | Order       | Voucher                  | Sample ID       | Process ID   | GenBank ID | Chemistry                     |
|--------------------------|-------------|--------------------------|-----------------|--------------|------------|-------------------------------|
| *Ochrolechia mahuensis*  | Pertusariales | NO, Finnmark, 2014, H. Holien | O-L-195912      | OLICH1757-14 | KY266861 |
| *Ochrolechia microstictoides* | Pertusariales | NO, Aust-Agder, 2014, J.T. Klepsland | O-L-200753      | OLICH3145-16 | MK812077 |
| *Ochrolechia parella*    | Pertusariales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196015      | OLICH1860-14 | MK811779 |
| *Ochrolechia parella*    | Pertusariales | NO, Nordland, 2014, J.T. Klepsland | O-L-200300      | OLICH3144-16 | MK811835 |
| *Ochrolechia subviridis* | Pertusariales | NO, Rogaland, 2014, J.T. Klepsland | O-L-200638      | OLICH2655-16 | MK812495 | gyrophoric acid |
| *Ochrolechia szatalaensis* | Pertusariales | NO, Troms, 2011, J.T. Klepsland | O-L-200097      | OLICH2653-16 | MK811817 | murolic acid (complex), variolaric acid |
| *Ochrolechia szatalaensis* | Pertusariales | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199529      | OLICH2654-16 | MK812256 |
| *Ochrolechia szatalaensis* | Pertusariales | NO, Nord-Trøndelag, 2014, J.T. Klepsland | O-L-200284      | OLICH3143-16 | MK811903 |
| *Ochrolechia szatalaensis* | Pertusariales | NO, Finnmark, 2011, J.T. Klepsland | O-L-200096      | OLICH3227-16 | MK811865 | murolic acid (complex), variolaric acid |
| *Ochrolechia tartarea*   | Pertusariales | NO, Finnmark, 2014, H. Holien | O-L-195951      | OLICH1796-14 | KY266863 |
| *Ochrolechia tartarea*   | Pertusariales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196041      | OLICH3795-17 | MK812341 |
| Species               | Order          | Voucher                  | Sample ID   | Process ID  | GenBank ID | Chemistry |
|----------------------|----------------|--------------------------|-------------|-------------|------------|-----------|
| Ochrolechia upsaliensis | Pertusariales | NO, Finnmark, 2014, H. Holien | O-L-195967 | OLICH1812-14 | KY266960   |           |
| Ochrolechia upsaliensis | Pertusariales | NO, Oppland, 2013, J.T. Klepsland | O-L-198354 | OLICH2376-16 | MK811642   |           |
| Opegrapha vermicellifera | Arthoniales   | NO, Hordaland, 2016, J.T. Klepsland | O-L-206757 | OLICH3476-17 | MK811737   |           |
| Ophioparma lapponica  | Umbilicariales | NO, Finnmark, 2014, T.B. Wheeler | O-L-195838 | OLICH1683-14 | KY266901   |           |
| Ophioparma ventosa    | Umbilicariales | FI, Inarin Lappi, 2014, E. Timdal | O-L-195498 | OLICH1503-14 | MK812137   |           |
| Ophioparma ventosa    | Umbilicariales | NO, Finnmark, 2014, E. Timdal | O-L-195543 | OLICH1512-14 | KY266864   |           |
| Ophioparma ventosa    | Umbilicariales | NO, Finnmark, 2014, E. Timdal | O-L-195574 | OLICH1525-14 | MK812332   |           |
| Ophioparma ventosa    | Umbilicariales | NO, Oppland, 2015, E. Timdal | O-L-201417 | OLICH3307-16 | MK811904   |           |
| Ophioparma ventosa    | Umbilicariales | NO, Troms, 2000, K. Lerfall | TROM_L_565529 | OLICH3550-17 | MK811740   |           |
| Orphniospora moriopsis | Umbilicariales | NO, Finnmark, 2014, H. Holien | O-L-195716 | OLICH1588-14 | KY266869   |           |
| Pannaria conoplea     | Peltigerales   | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196369 | OLICH1928-15 | MK811685   |           |
| Species            | Order       | Voucher          | Sample ID | Process ID | GenBank ID | Chemistry                                           |
|-------------------|-------------|------------------|-----------|------------|------------|-----------------------------------------------------|
| *Pannaria conoplea* | Peltigerales | NO, Sogn og Fjordane, 2012, T.H. Hofton & T. Høitomt | O-L-194474 | OLICH2379-16 | MK812100  | atranorin, lichesterinic acid, lobaric acid, protolichesterinic acid, salazinic acid |
| *Pannaria conoplea* | Peltigerales | NO, Hedmark, 2011, R. Haugan | O-L-173219 | OLICH2380-16 | MK812203  |                                                    |
| *Pannaria conoplea* | Peltigerales | NO, Hedmark, 2011, R. Haugan | O-L-173231 | OLICH2382-16 | MK812521  |                                                    |
| *Pannaria conoplea* | Peltigerales | NO, Hedmark, 2011, R. Haugan | O-L-173220 | OLICH2383-16 | MK811788  |                                                    |
| *Pannaria conoplea* | Peltigerales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200927 | OLICH2553-16 | MK812604  |                                                    |
| *Pannaria conoplea* | Peltigerales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201274 | OLICH2776-16 | MK812480  |                                                    |
| *Pannaria hookeri*  | Peltigerales | NO, Nordland, 2013, J.T. Klepsland | O-L-198018 | OLICH3882-17 | MK812291  |                                                    |
| *Pannaria rubiginosa* | Peltigerales | NO, Nordland, 2004, A. Elvebakk | TROM_L _1340509 | OLICH3563-17 | MK812061  |                                                    |
| *Pannaria rubiginosa* | Peltigerales | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201270 | OLICH3846-17 | MK812317  |                                                    |
| *Parmelia ernstiae*  | Lecanorales  | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201279 | OLICH2777-16 | MK567160  | atranorin, lichesterinic acid, lobaric acid, protolichesterinic acid, salazinic acid |
| Species                  | Order       | Voucher                  | Sample ID   | Process ID   | GenBank ID | Chemistry                                                                 |
|-------------------------|-------------|--------------------------|-------------|--------------|------------|---------------------------------------------------------------------------|
| *Parmelia ernstiae*     | Lecanorales | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201277  | OLICH3848-17 | MK567162 | atranorin, lichesterinic acid, lobaric acid, protolichesterinic acid, salazinic acid |
| *Parmelia fraudans*     | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196374  | OLICH1933-15 | MK812511 |                                                                        |
| *Parmelia omphalodes*   | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195947  | OLICH1792-14 | KY266894 |                                                                        |
| *Parmelia saxatilis*    | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195994  | OLICH1839-14 | MK567163 | atranorin, lobaric acid, salazinic acid                                   |
| *Parmelia saxatilis*    | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184724  | OLICH940-13  | MK567164 | atranorin, lobaric acid, salazinic acid                                   |
| *Parmelia serrana*      | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195995  | OLICH1840-14 | MK567161 | atranorin, lichesterinic acid, lobaric acid, protolichesterinic acid, salazinic acid |
| *Parmelia serrana*      | Lecanorales | NO, Vestfold, 2016, S. Rui & E. Timdal | O-L-205007  | OLICH4004-17 | MK567159 | atranorin, lichesterinic acid, lobaric acid, protolichesterinic acid, salazinic acid |
| *Parmelia sulcata*      | Lecanorales | NO, Telemark, 2014, E. Timdal | O-L-195789  | OLICH1661-14 | MK811938 |                                                                        |
| *Parmelia sulcata*      | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196000  | OLICH1845-14 | MK812088 |                                                                        |
| Species         | Order       | Voucher            | Sample ID | Process ID  | GenBank ID | Chemistry |
|-----------------|-------------|--------------------|-----------|-------------|------------|-----------|
| **Parmelia sulcata** | Lecanorales | NO, Oslo, 2014, M. Bendiksby et al. | O-L-196057 | OLICH1873-14 | MK812065   |           |
| **Parmelia sulcata** | Lecanorales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196331 | OLICH2261-15 | MK812499   |           |
| **Parmelia sulcata** | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184694 | OLICH878-13 | MK812475   |           |
| **Parmeliella parvula** | Peltigerales | NO, Nord-Trøndelag, 2013, J.T. Klepsland | O-L-197955 | OLICH2107-15 | MK812304   |           |
| **Parmeliella triptophylla** | Peltigerales | NO, Telemark, 2015, E. Timdal | O-L-207999 | OLICH3873-17 | MK812457   |           |
| **Parmelina pastilifera** | Lecanorales | NO, Rogaland, 2013, J.T. Klepsland | O-L-198298 | OLICH2377-16 | MK812633   |           |
| **Parmelina pastilifera** | Lecanorales | NO, Hordaland, 2006, H. Fjeldstad & G. Gaarder | O-L-202999 | OLICH3231-16 | MK812400   |           |
| **Parmelina pastilifera** | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-205003 | OLICH4005-17 | MK812564   |           |
| **Parmelina pastilifera** | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204989 | OLICH4006-17 | MK812554   |           |
| **Parmelina pastilifera** | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-205000 | OLICH4007-17 | MK812365   |           |
| **Parmelina tiliacea** | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-199984 | OLICH1958-15 | MK812323   |           |
| Species       | Order       | Voucher               | Sample ID | Process ID   | GenBank ID | Chemistry |
|--------------|-------------|-----------------------|-----------|--------------|------------|-----------|
| *Parmelina tiliacea* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196287 | OLICH2217-15 | MK812693   |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | NO, Oslo, 2014, E. Timdal | O-L-198924 | OLICH2477-16 | MK811628  |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200873 | OLICH2525-16 | MK812259  |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | NO, Akershus, 2015, S. Rui & E. Timdal | O-L-200818 | OLICH2589-16 | MK812562  |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | NO, Oppland, 2015, E. Timdal | O-L-201334 | OLICH2718-16 | MK811862  |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | NO, Oslo, 2016, S. Rui & E. Timdal | O-L-203344 | OLICH3314-16 | MK812472  |           |
|              |             |                       |           |              |            |           |
| *Parmelina tiliacea* | Lecanorales | NO, Rogaland, 2015, T. Tønsberg & E. Nygaard | BG-L-98117 | OLICH3696-17 | MK812477  |           |
|              |             |                       |           |              |            |           |
| *Parmeliopsis ambigua* | Lecanorales | NO, Finnmark, 2014, R. Haugan | O-L-195902 | OLICH1747-14 | KY266965  |           |
|              |             |                       |           |              |            |           |
| *Parmeliopsis ambigua* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195934 | OLICH1779-14 | KY266851  |           |
|              |             |                       |           |              |            |           |
| *Parmeliopsis ambigua* | Lecanorales | NO, Finnmark, 2014, H. Holien | O-L-195990 | OLICH1835-14 | KY266850  |           |
|              |             |                       |           |              |            |           |
| *Parmeliopsis ambigua* | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184695 | OLICH879-13 | MK811727  |           |
| Species          | Order            | Voucher         | Sample ID  | Process ID  | GenBank ID  | Chemistry |
|------------------|------------------|-----------------|------------|-------------|-------------|-----------|
| Parmeliopsis     | Lecanorales      | NO, Finnmark,   | O-L-195989 | OLICH1834-14| KY266853    |           |
| hyperopta        |                  | 2014, H. Holien |            |             |             |           |
| Parmeliopsis     | Lecanorales      | NO, Buskerud,   | O-L-184696 | OLICH880-13 | MK812515    |           |
| hyperopta        |                  | 2013, S. Rui & E. Timdal |   |             |             |           |
| Parmotrema       | Lecanorales      | NO, Vest-Agder, | O-L-197835 | OLICH2109-15| MK812284    |           |
| crinitum         |                  | 2013, J.T. Klepsland |   |             |             |           |
| Parmotrema       | Lecanorales      | NO, Vest-Agder, | O-L-197840 | OLICH2110-15| MK811794    |           |
| crinitum         |                  | 2013, J.T. Klepsland |   |             |             |           |
| Parmotrema       | Lecanorales      | NO, Rogaland,   | O-L-200600 | OLICH2651-16| MK812450    |           |
| perlatum         |                  | 2014, J.T. Klepsland |   |             |             |           |
| Parmotrema       | Lecanorales      | NO, Rogaland,   | O-L-200643 | OLICH4358-17| MK812630    |           |
| perlatum         |                  | 2014, J.T. Klepsland |   |             |             |           |
| Pectenia         | Peltigerales     | NO, Nord-Trøndelag, 2013, H. Holien | O-L-193006 | OLICH1477-14| MK811927    |           |
| cyanoloma        |                  |                 |            |             |             |           |
| Pectenia         | Peltigerales     | NO, Sogn og Fjordane, 2017, O. Olsen | O-L-207808 | OLICH4320-17| MK812029    |           |
| cyanoloma        |                  |                 |            |             |             |           |
| Peltigera        | Peltigerales     | NO, Finnmark,   | O-L-195726 | OLICH1598-14| KY266857    |           |
| aphthosa         |                  | 2014, E. Timdal |            |             |             |           |
| Peltigera        | Peltigerales     | NO, Buskerud,   | O-L-200017 | OLICH1991-15| MK811726    |           |
| aphthosa         |                  | 2014, S. Rui & E. Timdal |   |             |             |           |
| Peltigera        | Peltigerales     | NO, Buskerud,   | O-L-184749 | OLICH2048-15| MK812596    |           |
| aphthosa         |                  | 2013, S. Rui & E. Timdal |   |             |             |           |
| Peltigera        | Peltigerales     | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200534 | OLICH2611-16| MK811760    |           |
| aphthosa         |                  |                 |            |             |             |           |
| Species          | Order       | Voucher               | Sample ID  | Process ID | GenBank ID | Chemistry |
|------------------|-------------|-----------------------|------------|------------|------------|-----------|
| *Peltigera*      | Peltigerales| NO, Telemark,         | O-L-208000 | OLICH3874-17| MK811699   |           |
| *aphthosa*       |             | 2015, E. Timdal       |            |            |            |           |
| *Peltigera*      | Peltigerales| NO, Buskerud,         | O-L-208028 | OLICH4256-17| MK811816   |           |
| *aphthosa*       |             | 2016, M. Bendiksvb & E. Timdal |           |            |            |           |
| *Peltigera*      | Peltigerales| NO, Nord-Trøndelag,   | O-L-201329 | OLICH2689-16| MK812626   |           |
| *britannica*     |             | 2015, E. Timdal et al.|            |            |            |           |
| *Peltigera*      | Peltigerales| NO, Sør-Trøndelag,    | O-L-200554 | OLICH2610-16| MK811916   |           |
| *canina*         |             | 2014, J.T. Klepsland  |            |            |            |           |
| *Peltigera*      | Peltigerales| NO, Østfold,          | O-L-206918 | OLICH4134-17| MK812107   |           |
| *canina*         |             | 2012, K.A. Lye        |            |            |            |           |
| *Peltigera*      | Peltigerales| NO, Sør-Trøndelag,    | O-L-206873 | OLICH4135-17| MK811752   |           |
| *collina*        |             | 2014, E. Timdal       |            |            |            |           |
| *Peltigera*      | Peltigerales| SE, Södermanland,     | O-L-200865 | OLICH2517-16| MK811975   |           |
| *collina*        |             | 2015, S. Kistenich & E. Timdal |           |            |            |           |
| *Peltigera*      | Peltigerales| NO, Telemark,         | O-L-200926 | OLICH2540-16| MK812019   |           |
| *collina*        |             | 2015, S. Rui & E. Timdal |           |            |            |           |
| *Peltigera*      | Peltigerales| NO, Nord-Trøndelag,   | O-L-201268 | OLICH3845-17| MK811743   |           |
| *collina*        |             | 2015, R. Haugan       |            |            |            |           |
| *Peltigera*      | Peltigerales| NO, Telemark,         | O-L-196276 | OLICH1950-15| MK812238   |           |
| *degenii*        |             | 2014, E. Timdal       |            |            |            |           |
| Species                        | Order      | Voucher                      | Sample ID | Process ID     | GenBank ID | Chemistry |
|-------------------------------|------------|------------------------------|-----------|----------------|------------|-----------|
| *Peltigera degenii*           | Peltigerales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196335 | OLICH2273-15   | MK812333   |           |
| *Peltigera degenii*           | Peltigerales | NO, Buskerud, 2016, S. Rui & E. Timdal | O-L-208031 | OLICH4259-17   | MK812618   |           |
| *Peltigera didactyla*         | Peltigerales | NO, Telemark, 2015, E. Timdal | O-L-208003 | OLICH3877-17   | MK811844   |           |
| *Peltigera elisabethae*       | Peltigerales | NO, Buskerud, 2014, E. Timdal | O-L-196071 | OLICH1887-14   | MK811869   |           |
| *Peltigera extenuata*         | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196343 | OLICH1903-15   | MK811873   |           |
| *Peltigera extenuata*         | Peltigerales | NO, Oslo, 2014, E. Timdal     | O-L-200007 | OLICH1981-15   | MK811908   |           |
| *Peltigera extenuata*         | Peltigerales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200018 | OLICH1992-15   | MK811654   |           |
| *Peltigera horizontalis*      | Peltigerales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184750 | OLICH2083-15   | MK811925   |           |
| *Peltigera horizontalis*      | Peltigerales | NO, Hedmark, 2014, R. Haugan   | O-L-198894 | OLICH2391-16   | MK812678   |           |
| *Peltigera horizontalis*      | Peltigerales | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200862 | OLICH2514-16   | MK811673   |           |
| *Peltigera horizontalis*      | Peltigerales | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208021 | OLICH4193-17   | MK812656   |           |
| Species            | Order          | Voucher               | Sample ID       | Process ID       | GenBank ID   | Chemistry |
|--------------------|----------------|-----------------------|-----------------|-----------------|--------------|-----------|
| Peltigera hymenina | Peltigerales   | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200019     | O-LICH1993-15   | MK812274    |           |
| Peltigera hymenina | Peltigerales   | NO, Oslo, 2014, E. Timdal | O-L-198933     | O-LICH2485-16   | MK811966    |           |
| Peltigera hymenina | Peltigerales   | NO, Vestfold, 2015, E. Timdal | O-L-198944     | O-LICH2495-16   | MK812144    |           |
| Peltigera hymenina | Peltigerales   | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201328     | O-LICH2688-16   | MK811735    |           |
| Peltigera lepidophora | Peltigerales | NO, Telemark, 2015, E. Timdal & S. Rui | O-L-200874     | O-LICH3835-17   | MK812313    |           |
| Peltigera lepidophora | Peltigerales | NO, Sør-Trøndelag, 2013, E. Timdal | O-L-184530     | O-LICH732-13    | MK812625    |           |
| Peltigera leucoplebia | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196342     | O-LICH1902-15   | MK812292    |           |
| Peltigera leucoplebia | Peltigerales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200020     | O-LICH1994-15   | MK811981    |           |
| Peltigera leucoplebia | Peltigerales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200929     | O-LICH2555-16   | MK811680    |           |
| Peltigera leucoplebia | Peltigerales | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201315     | O-LICH2684-16   | MK812123    |           |
| Peltigera leucoplebia | Peltigerales | NO, Svalbard, 2015, S. Rui | O-L-203280     | O-LICH2699-16   | MK811857    |           |
| Species                  | Order        | Voucher                  | Sample ID | Process ID | GenBank ID | Chemistry   |
|--------------------------|--------------|--------------------------|-----------|------------|------------|-------------|
| *Peltigera leucophlebia* | Peltigerales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196030 | OLICH3807-17 | MK812241   |             |
| *Peltigera leucophlebia* | Peltigerales | NO, Oppland, 2015, E. Timdal | O-L-201400 | OLICH4181-17 | MK812102   |             |
| *Peltigera malacea*      | Peltigerales | NO, Finnmark, 2014, E. Timdal | O-L-195725 | OLICH1597-14 | KY266940   |             |
| *Peltigera malacea*      | Peltigerales | NO, Finnmark, 2014, R. Haugan | O-L-195848 | OLICH1693-14 | KY266836   |             |
| *Peltigera malacea*      | Peltigerales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196362 | OLICH1921-15 | MK811739   |             |
| *Peltigera malacea*      | Peltigerales | NO, Oslo, 2014, E. Timdal | O-L-200006 | OLICH1980-15 | MK812014   |             |
| *Peltigera malacea*      | Peltigerales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184751 | OLICH2085-15 | MK811998   |             |
| *Peltigera malacea*      | Peltigerales | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201331 | OLICH2690-16 | MK811990   |             |
| *Peltigera membranacea*  | Peltigerales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195991 | OLICH1836-14 | MK811987   |             |
| *Peltigera membranacea*  | Peltigerales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200024 | OLICH2472-16 | MK812374   |             |
| *Peltigera neckeri*      | Peltigerales | NO, Finnmark, 2014, E. Timdal | O-L-195753 | OLICH1625-14 | KY266937   |             |
| Species               | Order          | Voucher                  | Sample ID   | Process ID          | GenBank ID | Chemistry |
|---------------------|---------------|--------------------------|-------------|---------------------|------------|-----------|
| *Peltigera neckeri* | Peltigerales  | NO, Finnmark, 2014, E. Timdal | O-L-195932 | OLICH1777-14        | MK811778   |           |
| *Peltigera neckeri* | Peltigerales  | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200910 | OLICH2582-16        | MK811968   |           |
| *Peltigera neocanina* | Peltigerales  | NO, Buskerud, 2014, R. Haugan & E. Timdal | O-L-196062 | OLICH1878-14        | MK812413   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Telemark, 2014, E. Timdal | O-L-196266 | OLICH1941-15        | MK812243   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Telemark, 2014, E. Timdal | O-L-196277 | OLICH1946-15        | MK812022   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Oslo, 2014, E. Timdal | O-L-199994 | OLICH1968-15        | MK812548   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184753 | OLICH2084-15        | MK811653   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200025 | OLICH2473-16        | MK812286   |           |
| *Peltigera neopolydactyla* | Peltigerales  | NO, Nord-Trøndelag, 2015, E. Timdal et al. | O-L-201332 | OLICH2691-16        | MK812172   |           |
| *Peltigera polydactylon* | Peltigerales  | NO, Telemark, 2014, E. Timdal | O-L-196264 | OLICH1939-15        | MK811815   |           |
| *Peltigera polydactylon* | Peltigerales  | NO, Telemark, 2014, E. Timdal | O-L-195820 | OLICH2192-15        | MK812112   |           |
| *Peltigera polydactylon* | Peltigerales  | NO, Buskerud, 2016, S. Rui & E. Timdal | O-L-206899 | OLICH4136-17        | MK812583   |           |
| Species          | Order              | Voucher                   | Sample ID | Process ID    | GenBank ID | Chemistry |
|------------------|--------------------|---------------------------|-----------|---------------|------------|-----------|
| *Peltigera praetextata* | Peltigerales       | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184752 | OLICH2044-15  | MK811692   |           |
| *Peltigera praetextata* | Peltigerales       | NO, Oslo, 2014, E. Timdal  | O-L-195837 | OLICH2209-15  | MK811856   |           |
| *Peltigera praetextata* | Peltigerales       | NO, Akershus, 2009, T. Starholm | O-L-201769 | OLICH3890-17  | MK812051   |           |
| *Peltigera praetextata* | Peltigerales       | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208022 | OLICH4194-17  | MK812578   |           |
| *Peltigera retifoveata* | Peltigerales       | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200533 | OLICH2605-16  | MK811996   |           |
| *Peltigera rufescens*  | Peltigerales       | NO, Oslo, 2014, S. Rui & E. Timdal | O-L-196072 | OLICH1888-14  | MK812663   |           |
| *Peltigera rufescens*  | Peltigerales       | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196341 | OLICH1901-15  | MK811858   |           |
| *Peltigera rufescens*  | Peltigerales       | NO, Akershus, 2014, E. Timdal | O-L-199989 | OLICH1963-15  | MK812224   |           |
| *Peltigera rufescens*  | Peltigerales       | NO, Oppland, 2015, E. Timdal | O-L-201347 | OLICH2733-16  | MK812696   |           |
| *Peltigera scabrosa*   | Peltigerales       | NO, Finnmark, 2014, E. Timdal | O-L-195729 | OLICH1601-14  | KY266948   |           |
| *Peltigera scabrosa*   | Peltigerales       | NO, Finnmark, 2014, E. Timdal | O-L-195765 | OLICH1637-14  | KY266970   |           |
| *Peltigera scabrosa*   | Peltigerales       | NO, Telemark, 2015, E. Timdal | O-L-207997 | OLICH3871-17  | MK812044   |           |
| Species            | Order               | Voucher               | Sample ID | Process ID | GenBank ID | Chemistry       |
|--------------------|---------------------|-----------------------|-----------|------------|------------|-----------------|
| *Peltigera scabrosella* | Peltigerales        | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201255 | OLICH2763-16 | MK812406 |                  |
| *Peltigera scabrosella* | Peltigerales        | NO, Telemark, 2015, E. Timdal | O-L-207998 | OLICH3872-17 | MK812463 |                  |
| *Peltula euploca*    | Lichinales          | NO, Oppland, 2013, J.T. Klepsland | O-L-197859 | OLICH2111-15 | MK811928 |                  |
| *Pertusaria alpina*  | Pertusariales       | NO, Nordland, 2014, J.T. Klepsland | O-L-200312 | OLICH3141-16 | MK811905 |                  |
| *Pertusaria alpina*  | Pertusariales       | NO, Nord-Trøndelag, 2013, J.T. Klepsland | O-L-197933 | OLICH4038-17 | MK811785 |                  |
| *Pertusaria aspergilla* | Pertusariales      | NO, Sør-Trøndelag, 2015, H. Holien | TRH-L-16775 | OLICH3686-17 | MK812282 |                  |
| *Pertusaria aspergilla* | Pertusariales      | NO, Nordland, 2015, T. Tønsberg | BG-L-99158 | OLICH3716-17 | MK812384 |                  |
| *Pertusaria aspergilla* | Pertusariales      | NO, Østfold, 2015, R. Haugan | O-L-204101 | OLICH3929-17 | MK812496 | fumarprotocetraric acid |
| *Pertusaria carneopallida* | Pertusariales    | NO, Nordland, 2013, J.T. Klepsland | O-L-198006 | OLICH4039-17 | MK812218 | norstictic acid |
| *Pertusaria excludens* | Pertusariales      | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-203909 | OLICH3927-17 | MK811670 | norstictic acid |
| Species              | Order          | Voucher            | Sample ID      | Process ID     | GenBank ID   | Chemistry         |
|----------------------|----------------|--------------------|----------------|---------------|--------------|-------------------|
| *Pertusaria excludens* | Pertusariales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-203523     | OLICH3935-17 | MK812675     | norstictic acid   |
| *Pertusaria flavicans* | Pertusariales | NO, Møre og Romsdal, 2015, T. Tønsberg | BG-L-99071     | OLICH3777-17 | MK812409     |                   |
| *Pertusaria flavida* | Pertusariales | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200860     | OLICH2512-16 | MK811913     |                   |
| *Pertusaria leioplaca* | Pertusariales | NO, Troms, 2000, S. Werth | TROM_L_565683  | OLICH3551-17 | MK811922     |                   |
| *Pertusaria pertusa* | Pertusariales | NO, Vestfold, 2015, E. Timdal | O-L-198948     | OLICH2502-16 | MK812037     |                   |
| *Phaeophyscia endococcina* | Caliciales | NO, Finnmark, 2014, R. Haugan | O-L-198738     | OLICH2400-16 | MK812217     |                   |
| *Phaeophyscia kairamoi* | Caliciales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196355     | OLICH1914-15 | MK811724     |                   |
| *Phaeophyscia orbicularis* | Caliciales | NO, Finnmark, 2014, E. Timdal | O-L-195734     | OLICH1606-14 | KY266882     |                   |
| *Phaeophyscia orbicularis* | Caliciales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196004     | OLICH1849-14 | MK811854     |                   |
| *Phaeophyscia orbicularis* | Caliciales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196291     | OLICH2221-15 | MK811807     |                   |
| *Phaeophyscia orbicularis* | Caliciales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196330     | OLICH2259-15 | MK812383     |                   |
| Species               | Order      | Voucher          | Sample ID | Process ID | GenBank ID | Chemistry |
|----------------------|------------|------------------|-----------|------------|------------|-----------|
| Phaeophyscia orbicularis | Caliciales | NO, Hedmark, 2014, R. Haugan | O-L-207984 | OLICH3819-17 | MK812363   |           |
| Phaeophyscia sciastra   | Caliciales | NO, Finnmark, 2014, E. Timdal | O-L-195721 | OLICH1593-14 | KY266937   |           |
| Phaeophyscia sciastra   | Caliciales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196352 | OLICH1911-15 | MK812372   |           |
| Phlyctis agelaea       | Ostropales | NO, Hordaland, 2015, J.T. Klepsland | O-L-206746 | OLICH3465-17 | MK812009   |           |
| Phlyctis argena        | Ostropales | NO, Nordland, 2015, T. Tønsberg & A. Botnen | BG-L-98987 | OLICH3760-17 | MK811759   |           |
| Phlyctis argena        | Ostropales | NO, Nordland, 2015, T. Tønsberg & A. Botnen | BG-L-99194 | OLICH3761-17 | MK811753   |           |
| Phlyctis argena        | Ostropales | NO, Buskerud, 2014, T. Tønsberg | BG-L-99532 | OLICH3786-17 | MK811872   |           |
| Physcia adscendens    | Caliciales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196005 | OLICH1850-14 | MK811630   |           |
| Physcia adscendens    | Caliciales | NO, Vestfold, 2015, E. Timdal | O-L-198947 | OLICH2501-16 | MK812201   |           |
| Physcia aipolia       | Caliciales | NO, Telemark, 2014, E. Timdal | O-L-195783 | OLICH1655-14 | MK812601   |           |
| Species         | Order      | Voucher                        | Sample ID   | Process ID   | GenBank ID | Chemistry |
|-----------------|------------|--------------------------------|-------------|--------------|------------|-----------|
| Physcia aipolia | Caliciales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195992  | OLICH1837-14 | MK811770   |           |
| Physcia aipolia | Caliciales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200890  | OLICH2528-16 | MK811989   |           |
| Physcia aipolia | Caliciales | NO, Oslo, 2014, J.T. Klepsland   | O-L-200142  | OLICH2609-16 | MK812087   |           |
| Physcia aipolia | Caliciales | NO, Østfold, 2012, K.A. Lye      | O-L-206860  | OLICH4138-17 | MK811719   |           |
| Physcia alnophila | Caliciales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201269  | OLICH2773-16 | MK812315   |           |
| Physcia caesia  | Caliciales | NO, Telemark, 2014, E. Timdal    | O-L-195792  | OLICH1664-14 | MK811883   |           |
| Physcia caesia  | Caliciales | NO, Oslo, 2014, M. Bendiksby et al. | O-L-196078  | OLICH1894-14 | MK812056   |           |
| Physcia caesia  | Caliciales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196333  | OLICH2263-15 | MK812325   |           |
| Physcia caesia  | Caliciales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196035  | OLICH3791-17 | MK812524   |           |
| Physcia dubia   | Caliciales | NO, Oppland, 2013, J.T. Klepsland | O-L-197852  | OLICH2113-15 | MK812017   |           |
| Physcia dimidiata | Caliciales | NO, Buskerud, 2015, E. Timdal    | O-L-201418  | OLICH3299-16 | MK812556   |           |
| Species               | Order       | Voucher                  | Sample ID | Process ID   | GenBank ID | Chemistry |
|-----------------------|-------------|--------------------------|-----------|--------------|------------|-----------|
| Physcia dubia         | Caliciales  | NO, Oppland, 2015, E. Timdal | O-L-201373 | OLICH2748-16 | MK811700  |
| Physcia magnussonii   | Caliciales  | NO, Sogn og Fjordane, 2013, J.T. Klepsland | O-L-197861 | OLICH2114-15 | MK811875  |
| Physcia phaea          | Caliciales  | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196373 | OLICH1932-15 | MK811892  |
| Physcia stellaris     | Caliciales  | NO, Troms, 2014, E. Timdal | O-L-195769 | OLICH1641-14 | MK811861  |
| Physcia stellaris     | Caliciales  | NO, Østfold, 2012, K.A. Lye | O-L-206903 | OLICH4137-17 | MK812381  |
| Physcia tenella       | Caliciales  | NO, Finnmark, 2014, E. Timdal | O-L-195561 | OLICH1519-14 | KY266867  |
| Physcia tenella       | Caliciales  | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196007 | OLICH1852-14 | MK811920  |
| Physcia tenella       | Caliciales  | NO, Oslo, 2014, M. Bendiksby et al. | O-L-196079 | OLICH1895-14 | MK811798  |
| Physcia tenella       | Caliciales  | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196294 | OLICH2224-15 | MK811848  |
| Physcia tenella       | Caliciales  | NO, Rogaland, 2013, J.T. Klepsland | O-L-198307 | OLICH2357-15 | MK811950  |
| Physcia tenella       | Caliciales  | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196034 | OLICH3798-17 | MK812588  |
| Species                  | Order     | Voucher                          | Sample ID  | Process ID   | GenBank ID  | Chemistry |
|-------------------------|-----------|----------------------------------|------------|--------------|-------------|-----------|
| *Physconia distorta*    | Caliciales | NO, Akershus, 2014, E. Timdal    | O-L-199983 | OLICH1957-15 | MK811745    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia distorta*    | Caliciales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196290 | OLICH2220-15 | MK812071    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia enteroxantha*| Caliciales | NO, Oslo, 2014, R. Haugan et al. | O-L-196058 | OLICH1874-14 | MK811840    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia enteroxantha*| Caliciales | NO, Akershus, 2014, E. Timdal    | O-L-199986 | OLICH1960-15 | MK811812    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia enteroxantha*| Caliciales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196293 | OLICH2223-15 | MK811936    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia enteroxantha*| Caliciales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196328 | OLICH2258-15 | MK812142    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia muscigena*   | Caliciales | NO, Finnmark, 2014, E. Timdal    | O-L-195722 | OLICH1594-14 | KY266849    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia muscigena*   | Caliciales | NO, Finnmark, 2014, E. Timdal    | O-L-195920 | OLICH1765-14 | KY266925    |           |
|                         |           |                                  |            |              |             |           |
| *Physconia muscigena*   | Caliciales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196344 | OLICH1904-15 | MK811781    |           |
|                         |           |                                  |            |              |             |           |
| *Pilophorus dovrensis*  | Lecanorales | NO, Troms, 2003, E. Timdal       | O-L-123083 | OLICH2111-13 | MK812599    |           |
|                         |           |                                  |            |              |             |           |
| *Placynthiella oligotropha* | Trapeliales | NO, Oppland, 2012, E. Timdal | O-L-182032 | OLICH1176-14 | MK811853    |           |
|                         |           |                                  |            |              |             |           |
| *Placynthiella oligotropha* | Trapeliales | NO, Oppland, 2011, M. Bendiksby et al. | O-L-175738 | OLICH1177-14 | MK812378    |           |
| Species               | Order         | Voucher            | Sample ID       | Process ID         | GenBank ID | Chemistry |
|----------------------|---------------|--------------------|-----------------|--------------------|------------|-----------|
| *Platismatia glauca* | Lecanorales   | NO, Troms, 2014, E. Timdal | O-L-195649 | OLICH1561-14 | MK812715  |           |
| *Platismatia glauca* | Lecanorales   | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195993 | OLICH1838-14 | MK812351  |           |
| *Platismatia glauca* | Lecanorales   | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200882 | OLICH2564-16 | MK812456  |           |
| *Platismatia glauca* | Lecanorales   | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184697 | OLICH881-13 | MK812210  |           |
| *Platismatia norvegica* | Lecanorales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201267 | OLICH2772-16 | MK812616  |           |
| *Platismatia norvegica* | Lecanorales | NO, Akershus, 2017, S. Rui & E. Timdal | O-L-206864 | OLICH4109-17 | MK812705  |           |
| *Pleopsidium chlorophanum* | Acarosporales | NO, Troms, 2014, E. Timdal | O-L-195643 | OLICH1555-14 | MK811850  |           |
| *Pleopsidium chlorophanum* | Acarosporales | NO, Finnmark, 2014, E. Timdal | O-L-195940 | OLICH1785-14 | KY266860  |           |
| *Pleopsidium chlorophanum* | Acarosporales | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201252 | OLICH2759-16 | MK812117  |           |
| *Pleopsidium chlorophanum* | Acarosporales | NO, Sør-Trøndelag, 2017, E. Timdal | O-L-208244 | OLICH4322-17 | MK812354  |           |
| Species                        | Order         | Voucher | Sample ID | Process ID | GenBank ID | Chemistry |
|-------------------------------|---------------|---------|-----------|------------|------------|-----------|
| *Pleopsidium chlorophanum*    | Acarosporales | NO, Telemark, 2013, E. Timdal | O-L-184414 | OLICH695-13 | MK812213  |           |
| *Pleopsidium flavum*          | Acarosporales | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200545 | OLICH2624-16 | MK811960  |           |
| *Pleopsidium flavum*          | Acarosporales | NO, Telemark, 2013, E. Timdal | O-L-184415 | OLICH696-13 | MK812038  |           |
| *Pleopsidium flavum*          | Acarosporales | NO, Hordaland, 2013, E. Timdal | O-L-184439 | OLICH697-13 | MK811877  |           |
| *Pleurosticta acetabulum*     | Lecanorales   | NO, Akershus, 2014, E. Timdal | O-L-199985 | OLICH1959-15 | MK812572  |           |
| *Pleurosticta acetabulum*     | Lecanorales   | NO, Vestfold, 2015, E. Timdal | O-L-198935 | OLICH2488-16 | MK812152  |           |
| *Pleurosticta acetabulum*     | Lecanorales   | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200869 | OLICH2521-16 | MK811775  |           |
| *Pleurosticta acetabulum*     | Lecanorales   | NO, Rogaland, 2015, T. Tønsberg & E. Nygaard | BG-L-98170 | OLICH3700-17 | MK811799  |           |
| *Pleurosticta acetabulum*     | Lecanorales   | NO, Østfold, 2002, B. P. Løfalk | O-L-108808 | OLICH4128-17 | MK812479  |           |
| *Polycauliona candelaria*     | Teloschistales | NO, Akershus, 2014, E. Timdal | O-L-199981 | OLICH1955-15 | MK811915  |           |
| *Polycauliona candelaria*     | Teloschistales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196326 | OLICH2256-15 | MK812066  |           |
| Species                  | Order             | Voucher                        | Sample ID | Process ID    | GenBank ID    | Chemistry |
|-------------------------|-------------------|--------------------------------|-----------|---------------|---------------|-----------|
| *Polycauliona candelaria* | Teloschistales    | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196340 | OLICH2278-15 | MK811959      |           |
| *Polychidium muscicola*  | Peltigerales      | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201293 | OLICH2795-16  | MK812283      |           |
| *Protoblastenia rupestris* | Lecanorales      | NO, Finnmark, 2014, A. Millanes | O-L-195859 | OLICH1704-14  | KY266981      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Hedmark, 2012, R. Haugan    | O-L-182289 | OLICH1084-14  | MK811666      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Hedmark, 2004, R. Haugan    | O-L-131761 | OLICH1085-14  | MK812532      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Nord-Trøndelag, 2009, J.T. Klepsland | O-L-165102 | OLICH1086-14  | MK812181      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Oppland, 2012, E. Timdal    | O-L-182031 | OLICH1140-14  | MK812033      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Nordland, 2010, T. Tønsberg | BG-L-92492 | OLICH601-13   | MK812586      |           |
| *Protomicarea limosa*    | Lecanorales       | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184281 | OLICH821-13   | MK812176      |           |
| *Protopannaria pezizoides* | Peltigerales    | NO, Finnmark, 2014, A. Guillermo | O-L-195697 | OLICH1569-14  | KY266840      |           |
| *Protopannaria pezizoides* | Peltigerales    | NO, Finnmark, 2014, E. Timdal   | O-L-195890 | OLICH1735-14  | KY266909      |           |
| Species               | Order            | Voucher                     | Sample ID | Process ID     | GenBank ID | Chemistry |
|-----------------------|------------------|-----------------------------|-----------|----------------|------------|-----------|
| *Protopannaria pezizoides* | Peltigerales     | NO, Finnmark, 2014, H. Holien | O-L-195970 | OLICH1815-14   | KY266886   |           |
| *Protopannaria pezizoides* | Peltigerales     | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196347 | OLICH1907-15   | MK811767   |           |
| *Protopannaria pezizoides* | Peltigerales     | NO, Nord-Trøndelag, 2013, J.T. Klepsland | O-L-197950 | OLICH2115-15   | MK812467   |           |
| *Protopannaria pezizoides* | Peltigerales     | NO, Svalbard, 2015, S. Rui | O-L-203297 | OLICH2706-16   | MK811974   |           |
| *Protoparmelia badia*    | Lecanorales      | NO, Finnmark, 2014, E. Timdal | O-L-195568 | OLICH1522-14   | KY266939   |           |
| *Protoparmelia badia*    | Lecanorales      | NO, Finnmark, 2014, A. Launis | O-L-195839 | OLICH1684-14   | KY266945   |           |
| *Pseudephebe minuscula*  | Lecanorales      | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196378 | OLICH1937-15   | MK811997   |           |
| *Pseudephebe minuscula*  | Lecanorales      | NO, Oppland, 2013, M. Bendiksbj et al. | O-L-184305 | OLICH736-13    | MK812067   |           |
| *Pseudephebe pubescens*  | Lecanorales      | NO, Troms, 2014, E. Timdal | O-L-195619 | OLICH1548-14   | MK812357   |           |
| *Pseudephebe pubescens*  | Lecanorales      | NO, Finnmark, 2014, E. Timdal | O-L-195849 | OLICH1694-14   | KY266938   |           |
| *Pseudephebe pubescens*  | Lecanorales      | NO, Finnmark, 2014, R. Haugan | O-L-195986 | OLICH1831-14   | KY266914   |           |
| Species               | Order       | Voucher                  | Sample ID  | Process ID | GenBank ID | Chemistry  |
|----------------------|-------------|--------------------------|------------|------------|------------|------------|
| *Pseudephebe*        | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184396 | OLICH694-13 | MK812150   |            |
| *pubescens*          |             |                          |            |            |            |            |
| *Pseudephebe*        | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184306 | OLICH735-13 | MK811888   |            |
| *pubescens*          |             |                          |            |            |            |            |
| *Pseudephebe*        | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184725 | OLICH941-13 | MK812652   |            |
| *pubescens*          |             |                          |            |            |            |            |
| *Pseudoevernia*      | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-195999 | OLICH1844-14 | MK812319   |            |
| *furfuracea*         |             |                          |            |            |            |            |
| *Pseudoevernia*      | Lecanorales | NO, Hedmark, 2016, E. Timdal | O-L-201522 | OLICH3984-17 | MK812161   |            |
| *furfuracea*         |             |                          |            |            |            |            |
| *Pseudoevernia*      | Lecanorales | NO, Aust-Agder, 2016, S. Rui & E. Timdal | O-L-204977 | OLICH4008-17 | MK812508   |            |
| *furfuracea*         |             |                          |            |            |            |            |
| *Pseudoevernia*      | Lecanorales | NO, Telemark, 2016, S. Rui & E. Timdal | O-L-205006 | OLICH4009-17 | MK811934   |            |
| *furfuracea*         |             |                          |            |            |            |            |
| *Pseudoevernia*      | Lecanorales | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184698 | OLICH882-13 | MK812628   |            |
| *furfuracea*         |             |                          |            |            |            |            |
| *Pseudocyphellaria*  | Peltigerales | NO, Nord-Trøndelag, 2013, J.T. Klepsland | O-L-197920 | OLICH2116-15 | MK812391   |            |
| *citrina*            |             |                          |            |            |            |            |
| *Pseudocyphellaria*  | Peltigerales | NO, Sør-Trøndelag, 2013, J.T. Klepsland | O-L-198050 | OLICH2117-15 | MK811890   |            |
| *citrina*            |             |                          |            |            |            |            |
| Species                  | Order                | Voucher                | Sample ID         | Process ID          | GenBank ID | Chemistry         |
|-------------------------|----------------------|------------------------|-------------------|---------------------|------------|-------------------|
| *Pseudocyphellaria citrina* | Peltigerales         | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201266        | O-LICH2771-16       | MK812527   |                   |
| *Pseudocyphellaria norvegica* | Peltigerales         | NO, Hordaland, 2006, H. Fjeldstad | O-L-203000        | O-LICH3242-16       | MK812692   |                   |
| *Psilolechia clavulifera* | Lecanorales          | NO, Akershus, 2009, J.T. Klepsland | O-L-164653        | O-LICH1081-14       | MK811831   |                   |
| *Psilolechia leprosa*   | Lecanorales          | NO, Finnmark, 2014, E. Timdal | O-L-195611        | O-LICH1544-14       | MK812516   |                   |
| *Psilolechia leprosa*   | Lecanorales          | NO, Aust-Agder, 2015, J.T. Klepsland | O-L-204517        | O-LICH4229-17       | MK811951   |                   |
| *Psilolechia leprosa*   | Lecanorales          | NO, Aust-Agder, 2015, J.T. Klepsland | O-L-204519        | O-LICH4251-17       | MK812436   |                   |
| *Psilolechia lucida*    | Lecanorales          | SE, Närke, 2013, M. Bendiksby et al. | O-L-184487        | O-LICH665-13        | MK811768   |                   |
| *Psora decipiens*       | Lecanorales          | NO, Oppland, 2013, J.T. Klepsland | O-L-198348        | O-LICH2358-15       | MK812030   |                   |
| *Psora decipiens*       | Lecanorales          | NO, Troms, 2014, J.T. Klepsland | O-L-200362        | O-LICH3264-16       | MK811804   |                   |
| *Psora globifera*       | Lecanorales          | NO, Nord-Trøndelag, 2011, J.T. Klepsland | O-L-177145        | O-LICH1319-14       | KU873929   | no lichen substances |
| Species       | Order       | Voucher                        | Sample ID | Process ID     | GenBank ID | Chemistry                  |
|--------------|-------------|--------------------------------|-----------|----------------|------------|-----------------------------|
| *Psora globifera* | Lecanorales | NO, Sør-Trøndelag, 2012, R. Hjelmstad | O-L-184143 | OLICH1320-14 | KU873932 | no lichen substances        |
| *Psora globifera* | Lecanorales | NO, Buskerud, 2014, J.T. Klepsland | O-L-200597 | OLICH2645-16 | MK812110 |                            |
| *Psora globifera* | Lecanorales | NO, Oppland, 2011, J.T. Klepsland | O-L-183774 | OLICH782-13 | KU873928 | no lichen substances        |
| *Psora globifera* | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184327 | OLICH820-13 | KU873930 | no lichen substances        |
| *Psora rubiformis* | Lecanorales | NO, Oppland, 2012, H. Bratli & R. Haugan | O-L-183466 | OLICH1082-14 | MK811688 |                            |
| *Psora rubiformis* | Lecanorales | NO, Nord-Trøndelag, 2011, J.T. Klepsland | O-L-177142 | OLICH1321-14 | MK812240 |                            |
| *Psora rubiformis* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195525 | OLICH1508-14 | KY266957 |                            |
| *Psora rubiformis* | Lecanorales | NO, Hordaland, 2013, E. Timdal | O-L-184422 | OLICH648-13 | MK811706 |                            |
| *Psora rubiformis* | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184359 | OLICH649-13 | MK812000 |                            |
| *Psora vallesiaca* | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184392 | OLICH650-13 | KU873926 | norstictic acid              |
| Species               | Order                | Voucher                        | Sample ID   | Process ID      | GenBank ID         | Chemistry     |
|----------------------|----------------------|--------------------------------|-------------|-----------------|--------------------|---------------|
| *Psora vallesiaca*   | Lecanorales          | NO, Oppland, 2011, J.T. Klepsland | O-L-183778  | OLICH780-13     | KU873927          | norstictic acid |
| *Psora vallesiaca*   | Lecanorales          | NO, Oppland, 2011, J.T. Klepsland | O-L-183760  | OLICH781-13     | KU873931          | norstictic acid |
| *Psorinia conglomerata* | Lecanorales        | NO, Oppland, 2012, H. Bratli & R. Haugan | O-L-182192  | OLICH1061-14    | MK812001          | stictic acid   |
| *Psoroma cinnamomeum* | Peltigerales        | NO, Sør-Trøndelag, 2013, E. Timdal | O-L-184538  | OLICH702-13     | MK811978          |               |
| *Psoroma hypnorum*   | Peltigerales         | NO, Finnmark, 2014, E. Timdal | O-L-195857  | OLICH1702-14    | KY266971          |               |
| *Psoroma hypnorum*   | Peltigerales         | NO, Sør-Trøndelag, 2017, E. Timdal | O-L-208202  | OLICH4325-17    | MK811800          |               |
| *Psoroma hypnorum*   | Peltigerales         | NO, Sør-Trøndelag, 2013, E. Timdal | O-L-184537  | OLICH703-13     | MK811764          |               |
| *Psoronactis dilleniana* | Arthoniales       | NO, Nord-Trøndelag, 2015, H. Holien | TRH-L-16932 | OLICH3649-17    | MK812257          |               |
| *Punctelia stictica* | Lecanorales          | NO, Oppland, 2015, E. Timdal | O-L-201333  | OLICH2698-16    | MK812448          |               |
| *Punctelia subrudecta* | Lecanorales        | NO, Rogaland, 2015, T. Tønsberg | BG-L-98118  | OLICH3697-17    | MK812035          |               |
| *Punctelia subrudecta* | Lecanorales        | NO, Rogaland, 2014, J.T. Klepsland | O-L-200662  | OLICH4106-17    | MK812237          |               |
| Species              | Order            | Voucher                  | Sample ID  | Process ID     | GenBank ID | Chemistry                        |
|---------------------|------------------|--------------------------|------------|----------------|------------|----------------------------------|
| *Pycnothelia papillaria* | Lecanorales     | NO, Aust-Agder, 2006, J.T. Klepsland | O-L-151129 | OLICH1364-14   | MK811765   | atranorin, lichesterinic acid    |
| *Pycnothelia papillaria* | Lecanorales     | NO, Oslo, 2014, E. Timdal        | O-L-200001 | OLICH1975-15   | MK812272   |                                  |
| *Pycnothelia papillaria* | Lecanorales     | NO, Nord-Trøndelag, 2015, M. Bendiksby et al. | O-L-201299 | OLICH2797-16   | MK811947   |                                  |
| *Pyrenula laevigata*   | Pyrenulales      | NO, Hordaland, 2016, J.T. Klepsland | O-L-206758 | OLICH3477-17   | MK812685   |                                  |
| *Pyrenula laevigata*   | Pyrenulales      | NO, Møre og Romsdal, 2016, J.T. Klepsland | O-L-206773 | OLICH3492-17   | MK812185   |                                  |
| *Pyrenula occidentalis* | Pyrenulales      | NO, Møre og Romsdal, 2016, J.T. Klepsland | O-L-206777 | OLICH3496-17   | MK811633   |                                  |
| *Racodium rupestre*    | Capnodiales      | NO, Rogaland, 2013, J.T. Klepsland | O-L-198464 | OLICH3945-17   | MK812095   |                                  |
| *Ramalina capitata*    | Lecanorales      | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200012 | OLICH1986-15   | MK811917   |                                  |
| *Ramalina capitata*    | Lecanorales      | NO, Buskerud, 2014, E. Timdal        | O-L-195831 | OLICH2203-15   | MK811626   |                                  |
| *Ramalina capitata*    | Lecanorales      | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200896 | OLICH2549-16   | MK812528   |                                  |
| Species               | Order     | Voucher                  | Sample ID     | Process ID   | GenBank ID | Chemistry                  |
|-----------------------|-----------|--------------------------|---------------|--------------|------------|----------------------------|
| *Ramalina capitata*   | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184378   | OLICH693-13 | MK812398   |                            |
| *Ramalina cuspidata*  | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196016   | OLICH1861-14 | MK812006   | usnic acid                 |
| *Ramalina cuspidata*  | Lecanorales | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-197829   | OLICH2118-15 | MK811797   |                            |
| *Ramalina farinacea*  | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196002   | OLICH1847-14 | MK812207   | protocetraric acid, usnic acid |
| *Ramalina farinacea*  | Lecanorales | NO, Akershus, 2014, E. Timdal | O-L-199987   | OLICH1961-15 | MK812169   | protocetraric acid, usnic acid |
| *Ramalina farinacea*  | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196286   | OLICH2216-15 | MK812449   | protocetraric acid, usnic acid |
| *Ramalina fastigiata* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196289   | OLICH2219-15 | MK811906   |                            |
| *Ramalina fastigiata* | Lecanorales | NO, Vestfold, 2014, J.T. Klepsland | O-L-200570   | OLICH2644-16 | MK811841   |                            |
| *Ramalina fastigiata* | Lecanorales | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208026   | OLICH4197-17 | MK812196   |                            |
| *Ramalina fraxinea*   | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196288   | OLICH2218-15 | MK812590   |                            |
| *Ramalina fraxinea*   | Lecanorales | NO, Vestfold, 2014, J.T. Klepsland | O-L-200571   | OLICH4105-17 | MK812489   |                            |
| *Ramalina fraxinea*   | Lecanorales | NO, Akershus, 2012, K.A. Lye | O-L-206861   | OLICH4140-17 | MK811900   |                            |
| Species         | Order       | Voucher          | Sample ID | Process ID       | GenBank ID | Chemistry                                      |
|-----------------|-------------|------------------|-----------|------------------|------------|-----------------------------------------------|
| *Ramalina fraxinea* | Lecanorales | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208025 | OLICH4196-17     | MK812162   |                                               |
| *Ramalina pollinaria* | Lecanorales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196372 | OLICH1931-15     | MK812166   |                                               |
| *Ramalina pollinaria* | Lecanorales | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200850 | OLICH2516-16     | MK812114   |                                               |
| *Ramalina pollinaria* | Lecanorales | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200901 | OLICH2552-16     | MK811866   |                                               |
| *Ramalina polymorpha* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195737 | OLICH1609-14     | KY266885   |                                               |
| *Ramalina polymorpha* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195928 | OLICH1773-14     | MK811690   |                                               |
| *Ramalina polymorpha* | Lecanorales | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-200011 | OLICH1985-15     | MK811661   |                                               |
| *Ramalina polymorpha* | Lecanorales | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200898 | OLICH2551-16     | MK812673   |                                               |
| *Ramalina siliquosa* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196010 | OLICH1855-14     | MK811720   | protocetraric acid (minor), salazinic acid (major), usnic acid (trace) |
| *Ramalina subfarinacea* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196284 | OLICH2214-15     | MK812104   | norstictic acid (major), usnic acid (major)    |
| *Ramalina subfarinacea* | Lecanorales | NO, Nordland, 2014, J.T. Klepsland | O-L-200339 | OLICH2643-16     | MK812227   | norstictic acid (major), usnic acid (major)    |
| Species                  | Order        | Voucher              | Sample ID | Process ID   | GenBank ID  | Chemistry                      |
|-------------------------|--------------|----------------------|-----------|--------------|-------------|--------------------------------|
| *Ramboldia elabens*     | Lecanorales  | NO, Sør-Trøndelag, 2007, E. Timdal | O-L-158501 | OLICH411-13  | MK812637    |                                |
| *Ramboldia elabens*     | Lecanorales  | NO, Hedmark, 2008, R. Haugan | O-L-160473 | OLICH412-13  | MK812132    |                                |
| *Ramboldia elabens*     | Lecanorales  | NO, Oppland, 2004, T.H. Hofton | O-L-136707 | OLICH413-13  | MK812702    |                                |
| *Ramboldia elabens*     | Lecanorales  | NO, Nord-Trøndelag, 2006, J.T. Klepsland | O-L-183511 | OLICH472-13  | MK811668    |                                |
| *Ramboldia elabens*     | Lecanorales  | NO, Finnmark, 2011, E. Timdal | O-L-170692 | OLICH473-13  | MK811870    |                                |
| *Ramboldia elabens*     | Lecanorales  | NO, Nordland, 2011, T. Tønsberg | BG-L-95299 | OLICH580-13  | MK812420    |                                |
| *Rhizocarpon badioatrum*| Rhizocarps   | NO, Oppland, 2010, E. Timdal | O-L-163824 | OLICH002-11  | KU687450    | no lichen substances           |
| *Rhizocarpon badioatrum*| Rhizocarps   | NO, Buskerud, 2010, E. Timdal | O-L-163839 | OLICH003-11  | KU687453    | no lichen substances           |
| *Rhizocarpon bolanderi* | Rhizocarps   | NO, Aust-Agder, 2010, E. Timdal | O-L-163373 | OLICH023-11  | KU687451    | norstictic acid (trace), stictic acid (major) |
| *Rhizocarpon chioneum*  | Rhizocarps   | NO, Finnmark, 2014, E. Timdal | O-L-195535 | OLICH1510-14 | KY266951    |                                |
| *Rhizocarpon copelandii*| Rhizocarps   | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184329 | OLICH766-13  | KU687447    |                                |
| Species              | Order               | Voucher                  | Sample ID      | Process ID         | GenBank ID | Chemistry                      |
|---------------------|---------------------|--------------------------|----------------|--------------------|------------|--------------------------------|
| *Rhizocarpon*       | *Rhizocarpales*     |                          | O-L-184521     | O-LICH790-13       | KU687456   | norstictic acid                |
| *copelandii*        |                     |                          | O-L-180002     | O-LICH837-13       | KU687455   | norstictic acid                |
| *Rhizocarpon*       | *Rhizocarpales*     |                          | O-L-195564     | O-LICH1520-14      | KY266908   | norstictic acid (trace), stictic acid (major) |
| *geminatum*         |                     |                          | O-L-163364     | O-LICH015-11       | KU687445   | norstictic acid (minor), stictic acid (major) |
| *Rhizocarpon*       | *Rhizocarpales*     |                          | O-L-163756     | O-LICH019-11       | KU687446   | stictic acid                   |
| *jermilandidicum*   |                     |                          | O-L-170452     | O-LICH803-13       | KU687460   | stictic acid                   |
| *leptolepis*        | *Rhizocarpales*     | Fi, Inarin Lappi, 2014, E. Timdal | O-L-195500     | O-LICH1504-14      | KU687449   |                                |
| *pycnocarpoides*    | *Rhizocarpales*     | NO, Nordland, 2012, R. Haugan | O-L-183808     | O-LICH511-13       | KT800004   | no lichen substances            |
| *pycnocarpoides*    |                     |                          | O-L-183810     | O-LICH512-13       | KT800005   | no lichen substances            |
| *pycnocarpoides*    |                     |                          | O-L-179903     | O-LICH513-13       | KT800002   | no lichen substances            |
| *pycnocarpoides*    |                     |                          | O-L-184267     | O-LICH531-13       | KT800003   | no lichen substances            |
| *rittokense*        | *Rhizocarpales*     | NO, Finnmark, 2014, M. Westberg | O-L-195695     | O-LICH1567-14      | KU687458   |                                |
| Species                  | Order       | Voucher               | Sample ID | Process ID | GenBank ID  | Chemistry                      |
|-------------------------|-------------|-----------------------|-----------|------------|-------------|-------------------------------|
| Rhizocarpon rittokense  | Rhizocarpales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184293 | OLICH542-13 | KU687459    |                               |
| Rhizocarpon santessonii | Rhizocarpales | NO, Oppland, 2011, R. Haugan & E. Timdal | O-L-169805 | OLICH432-13 | KU687454    |                               |
| Rhizocarpon subgeminatum| Rhizocarpales | NO, Hedmark, 2010, R. Haugan | O-L-166501 | OLICH033-11 | KU687457    | barbatic acid                 |
| Rhizocarpon subgeminatum| Rhizocarpales | NO, Sør-Trøndelag, 2010, R. Haugan | O-L-165477 | OLICH034-11 | KU687452    | barbatic acid                 |
| Rhizocarpon suomiense   | Rhizocarpales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184330 | OLICH769-13 | KU687448    |                               |
| Rhizoplaca melanophthalma| Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195929 | OLICH1774-14 | MK812478    | unknown substances, usnic acid |
| Rhizoplaca melanophthalma| Lecanorales | NO, Oppland, 2015, E. Timdal | O-L-201366 | OLICH2743-16 | MK811669    |                               |
| Rinodina balanina       | Caliciaceae  | NO, Finnmark, 2014, T.B. Wheeler | O-L-195705 | OLICH1577-14 | KY266842    |                               |
| Rinodina disjuncta      | Caliciaceae  | NO, Nord-Trøndelag, 2014, H. Holien | TRH-L-15387 | OLICH3675-17 | MK812529    |                               |
| Rinodina disjuncta      | Caliciaceae  | NO, Nord-Trøndelag, 2011, H. Holien | TRH-L-14116 | OLICH3676-17 | MK812438    |                               |
| Species                  | Order          | Voucher                  | Sample ID               | Process ID      | GenBank ID   | Chemistry |
|-------------------------|----------------|--------------------------|-------------------------|----------------|--------------|-----------|
| Rinodina mniaraea       | Caliciales     | NO, Svalbard, 2001, A. Elvebakk | TROM_L_565871          | OLICH3552-17   | MK812098     |           |
| Rinodina roboris        | Caliciales     | NO, Rogaland, 2016, J.T. Klepsland | O-L-206765          | OLICH3484-17   | MK811851     |           |
| Romjularia lurida       | Lecideales     | NO, Akershus, 2010, E. Timdal    | O-L-169118          | OLICH150-11    | MK811769     |           |
| Ropalospora lugubris    | Umbilicariales | NO, Finnmark, 2014, E. Timdal          | O-L-195537          | OLICH1511-14   | KY266893     |           |
| Ropalospora lugubris    | Umbilicariales | NO, Nordland, 2015, T. Tønsberg & A. Botnen | BG-L-98792        | OLICH3732-17   | MK812617     |           |
| Ropalospora lugubris    | Umbilicariales | NO, Finnmark, 2011, E. Timdal          | O-L-170519          | OLICH3969-17   | MK812431     |           |
| Ropalospora lugubris    | Umbilicariales | NO, Sør-Trøndelag, 2011, R. Haugan   | O-L-168439          | OLICH3970-17   | MK812670     |           |
| Ropalospora lugubris    | Umbilicariales | NO, Sogn og Fjordane, 2011, R. Haugan | O-L-173455          | OLICH3971-17   | MK812610     |           |
| Rusavskia elegans       | Teloschistales | NO, Sør-Trøndelag, 2014, E. Timdal          | O-L-196351          | OLICH1910-15   | MK812165     |           |
| Rusavskia elegans       | Teloschistales | NO, Oppland, 2013, J.T. Klepsland      | O-L-200120          | OLICH2630-16   | MK812212     |           |
| Rusavskia sorediata     | Teloschistales | NO, Sør-Trøndelag, 2014, E. Timdal    | O-L-196353          | OLICH1912-15   | MK811744     |           |
| Species                     | Order          | Voucher        | Sample ID  | Process ID    | GenBank ID   | Chemistry |
|-----------------------------|----------------|----------------|------------|---------------|--------------|-----------|
| *Sagiolechia protuberans*   | Ostropales     | NO, Finnmark,  | O-L-195714 | OLICH1586-14  | KY266966     |           |
|                            |                | 2014, M. Westberg |            |               |              |           |
| *Sagiolechia protuberans*   | Ostropales     | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201297 | OLICH3853-17  | MK811691    |           |
| *Sclerophora peronella*     | Coniochybales  | SE, Södermanland, 2015, S. Kistenich & E. Timdal | O-L-200846 | OLICH2432-16  | MK812193    |           |
| *Scoliciosporum umbrinum*   | Lecanorales    | NO, Oslo, 2014, J.T. Klepsland | O-L-200123 | OLICH3322-16  | MK812255    |           |
| *Scoliciosporum umbrinum*   | Lecanorales    | NO, Akershus, 2012, E. Timdal | O-L-177770 | OLICH822-13   | MK812271    |           |
| *Siphula ceratites*         | Pertusariales  | NO, Finnmark, 2014, E. Timdal | O-L-195919 | OLICH1764-14  | KY266949     |           |
| *Siphula ceratites*         | Pertusariales  | NO, Nord-Trøndelag, 2015, E. Timdal & et al. | O-L-201291 | OLICH2679-16  | MK812106    |           |
| *Siphula ceratites*         | Pertusariales  | NO, Ser-Trøndelag, 2014, R. Haugan | O-L-196042 | OLICH3790-17  | MK812034    |           |
| *Solorina saccata*          | Peltigerales   | NO, Buskerud, 2014, E. Timdal | O-L-203070 | OLICH3286-16  | MK812538    |           |
| *Sphaerophorus fragilis*    | Lecanorales    | NO, Troms, 2014, E. Timdal | O-L-195650 | OLICH1562-14  | MK812306    |           |
| Species            | Order        | Voucher                  | Sample ID | Process ID   | GenBank ID | Chemistry                  |
|--------------------|--------------|--------------------------|-----------|--------------|------------|----------------------------|
| *Sphaerophorus*    | Lecanorales  | NO, Hordaland, 2014, E.  | O-L-195800| OLICH1672-14| MK811867   | sphaerophorin              |
| *fragilis*         |              | Timdal                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Finnmark, 2014, E.   | O-L-195977| OLICH1822-14| KY266958   | sphaerophorin              |
| *fragilis*         |              | Timdal                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Finnmark, 2014, E.   | O-L-195855| OLICH1700-14| KY266841   | sphaerophorin              |
| *globosus*         |              | Timdal                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Finnmark, 2014, E.   | O-L-195918| OLICH1763-14| KY266859   | sphaerophorin, squamatic acid |
| *globosus*         |              | Timdal                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Finnmark, 2014, H.   | O-L-195949| OLICH1794-14| KY266898   | sphaerophorin              |
| *globosus*         |              | Holien                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Oslo, 2014, E.       | O-L-199995| OLICH1969-15| MK812694   | sphaerophorin, thamnolic acid, unknowns |
| *globosus*         |              | Timdal                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Telemark, 2015, S.   | O-L-200918| OLICH2578-16| MK812575   | sphaerophorin              |
| *globosus*         |              | Rui & E. Timdal          |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Trøndelag, 2014, R.  | O-L-196029| OLICH3793-17| MK811761   | sphaerophorin, squamatic acid |
| *globosus*         |              | Haugan                   |           |              |            |                            |
| *Sphaerophorus*    | Lecanorales  | NO, Nord-Trøndelag, 2015| O-L-201265| OLICH3844-17| MK812327   | sphaerophorin, thamnolic acid |
| *globosus*         |              | R. Haugan                |           |              |            |                            |
| Species                     | Order            | Voucher                              | Sample ID   | Process ID   | GenBank ID | Chemistry                                      |
|-----------------------------|------------------|--------------------------------------|-------------|--------------|------------|------------------------------------------------|
| *Staurolemma omphalarioides*| Peltigerales     | NO, Nordland, 2013, J.T. Klepsland   | O-L-197994  | OLICh2467-16 | MK811827   |                                                |
|                             | Peltigerales     | NO, Nordland, 2014, J.T. Klepsland   | O-L-200306  | OLICh2640-16 | MK811929   |                                                |
| *Stereocaulon alpinum*      | Lecanorales      | NO, Telemark, 2006, E. Timdal        | O-L-149404  | OLICh925-13  | MK812253   | atranorin, lobaric acid                        |
| *Stereocaulon capitellatum* | Lecanorales      | NO, Oppland, 2015, E. Timdal         | O-L-201401  | OLICh4182-17 | MK812320   | anziaic acid, atranorin, miroquidic acid, perlatalic acid |
| *Stereocaulon coniophyllum* | Lecanorales      | NO, Sogn og Fjordane, 2010, S. Vatne | O-L-169267  | OLICh713-13  | MK811930   | lobaric acid, atranorin                        |
| *Stereocaulon cumulatum*    | Lecanorales      | NO, Finnmark, 2014, M. Svensson      | O-L-195924  | OLICh1769-14 | KY266904   |                                                |
| *Stereocaulon cumulatum*    | Lecanorales      | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200899  | OLICh2529-16 | MK812171   |                                                |
| *Stereocaulon cumulatum*    | Lecanorales      | NO, Hedmark, 2013, E. Timdal         | O-L-184515  | OLICh674-13  | MK812474   |                                                |
| *Stereocaulon cumulatum*    | Lecanorales      | NO, Oppland, 2012, E. Timdal         | O-L-182037  | OLICh711-13  | MK812671   |                                                |
| *Stereocaulon grande*       | Lecanorales      | NO, Troms, 2003, E. Timdal           | O-L-122991  | OLICh917-13  | MK812157   | atranorin, bourgeanic acid, lobaric acid       |
| *Stereocaulon pileatum*     | Lecanorales      | NO, Aust-Agder, 2016, S. Rui & E. Timdal  | O-L-204980  | OLICh4012-17 | MK812053   |                                                |
| *Stereocaulon pileatum*     | Lecanorales      | NO, Østfold, 2002, B.P. Løfall & A. Often  | O-L-113318  | OLICh908-13  | MK812510   | atranorin, lobaric acid                        |
| Species          | Order              | Voucher                     | Sample ID  | Process ID  | GenBank ID | Chemistry                                    |
|------------------|--------------------|-----------------------------|------------|-------------|------------|----------------------------------------------|
| Stereocaulon pileatum | Lecanorales       | NO, Oslo, 2011, H. Bratli & R. Haugan | O-L-174391 | OLCIH909-13 | MK811864 | atranorin, lobaric acid                        |
| Stereocaulon rivulorum | Lecanorales       | NO, Troms, 2003, E. Timdal | O-L-127342 | OLCIH899-13 | MK812658 | anziaic acid, atranorin, perlatic acid        |
| Stereocaulon rivulorum | Lecanorales       | NO, Finnmark, 2003, E. Timdal | O-L-123189 | OLCIH901-13 | MK811662 | anziaic acid, atranorin, perlatic acid        |
| Stereocaulon symphycheilum | Lecanorales | NO, Oppland, 2012, H. Bratli | O-L-183927 | OLCIH706-13 | MK811941 | lobaric acid                                 |
| Stereocaulon symphycheilum | Lecanorales       | NO, Buskerud, 2012, S. Rui & E. Timdal | O-L-184640 | OLCIH730-13 | MK812328 | atranorin, lobaric acid                        |
| Stereocaulon symphycheilum | Lecanorales       | NO, Sør-Tønsberg, 2009, E. Timdal | O-L-158545 | OLCIH895-13 | MK812189 | atranorin, lobaric acid                        |
| Sticta fuliginoides | Peltigerales      | NO, Rogaland, 2012, B. Nordén & J.B. Jordal | O-L-199414 | OLCIH2638-16 | MK811703 |                                             |
| Sticta sylvatica | Peltigerales      | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200925 | OLCIH2539-16 | MK811909 |                                             |
| Tephromela atra  | Lecanorales       | NO, Finnmark, 2014, A. Millanes | O-L-195861 | OLCIH1706-14 | KY266944 |                                             |
| Tephromela atra  | Lecanorales       | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196054 | OLCIH3815-17 | MK812606 |                                             |
| Tephromela atra  | Lecanorales       | NO, Telemark, 2009, R. Haugan & S. Reiso | O-L-160434 | OLCIH399-13 | MK812380 |                                             |
| Species              | Order         | Voucher        | Sample ID   | Process ID  | GenBank ID | Chemistry                        |
|---------------------|---------------|----------------|-------------|-------------|------------|----------------------------------|
| *Tephromela grumosa* | Lecanorales   | NO, Oppland, 2013, M. Bendiksby et al. | O-L-190787  | OLICH2594-16 | MK812127  | atranorin, lichesterinic acid    |
| *Tetramelas chloroleucus* | Caliciales   | NO, Sør-Trøndelag, 2014, H. Holien | TRH-L-15560  | OLICH3601-17 | MK811644  |                                  |
| *Tetramelas chloroleucus* | Caliciales   | NO, Nordland, 2013, J.T. Klepsland | O-L-198004   | OLICH4032-17 | MK812300  |                                  |
| *Thamnolia vermicularis* | Pertusariales | NO, Finnmark, 2014, E. Timdal | O-L-195710   | OLICH1582-14 | KY266979  |                                  |
| *Thamnolia vermicularis* | Pertusariales | NO, Troms, 2014, E. Timdal | O-L-195773   | OLICH1645-14 | MK812339  |                                  |
| *Thamnolia vermicularis* | Pertusariales | NO, Finnmark, 2014, H. Holien | O-L-195948   | OLICH1793-14 | KY266969  |                                  |
| *Thamnolia vermicularis* | Pertusariales | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196363   | OLICH1922-15 | MK811783  |                                  |
| *Thamnolia vermicularis* | Pertusariales | NO, Buskerud, 2015, E. Timdal & S. Rui | O-L-200905   | OLICH3840-17 | MK811627  |                                  |
| *Thelotrema lepadinum*   | Ostropales    | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199496   | OLICH3321-16 | MK812434  |                                  |
| *Thelotrema macrosorum*   | Ostropales    | NO, Hordaland, 2013, B. Nordén & J.B. Jordal | O-L-199493   | OLICH3320-16 | MK812111  |                                  |
| Species                | Order          | Voucher       | Sample ID   | Process ID   | GenBank ID | Chemistry      |
|------------------------|----------------|---------------|-------------|--------------|------------|----------------|
| *Tholurna dissimilis*  | Caliciales     | NO, Buskerud, 2014, E. Timdal | O-L-195822  | OLICH2194-15 | MG812234   |                |
|                        |                | NO, Nord-Trøndelag, 2015, H. Holien | TRH-L-16038 | OLICH2760-16 | MG811683   |                |
| *Timdalia intricata*   | Acarosporales  | NO, Telemark, 2013, E. Timdal | O-L-194731  | OLICH3244-16 | MG812713   |                |
|                        |                | NO, Oppland, 2015, E. Timdal | O-L-201379  | OLICH4168-17 | MG812246   |                |
|                        |                | NO, Hedmark, 2017, E. Timdal | O-L-207764  | OLICH4349-17 | MG811937   | psoromic acid  |
|                        |                | SE, Jämtland, 2017, E. Timdal | O-L-208174  | OLICH4350-17 | MG811871   | psoromic acid  |
|                        |                | SE, Härjedalen, 2017, E. Timdal | O-L-208190  | OLICH4351-17 | MG812454   | psoromic acid  |
| *Toensbergia leucococca* | Rhizocarpales | NO, Nordland, 2012, T. Tønsberg | BG-L-94650  | OLICH592-13  | MG812615    |                |
| *Toninia alutacea*     | Lecanorales    | NO, Finnmark, 2014, E. Timdal | O-L-195931  | OLICH1776-14 | MG838194   |                |
|                        |                | NO, Buskerud, 2014, J.T. Klepsland | O-L-200591  | OLICH2636-16 | MG838164   |                |
| *Toninia alutacea*     | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184350  | OLICH551-13  | MG838166   |                |
| Species            | Order     | Voucher               | Sample ID  | Process ID | GenBank ID | Chemistry              |
|--------------------|-----------|-----------------------|------------|------------|------------|-------------------------|
| *Toninia alutacea* | Lecanorales | NO, Troms, 2011, J.T. Klepsland | O-L-177188 | OLICH561-13 | MG838197 | triterpenoid (minor)    |
| *Toninia alutacea* | Lecanorales | NO, Oppland, 2011, J.T. Klepsland | O-L-183755 | OLICH783-13 | MG838156 | triterpenoid (minor)    |
| *Toninia aromatica* | Lecanorales | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200557 | OLICH3317-16 | MG838189 | triterpenoid (minor)    |
| *Toninia aromatica* | Lecanorales | NO, Troms, 2009, J.T. Klepsland | O-L-167368 | OLICH560-13 | MG838184 | triterpenoid (minor)    |
| *Toninia aromatica* | Lecanorales | NO, Nordland, 2011, R. Haugan | O-L-174042 | OLICH614-13 | MG838161 | triterpenoid (minor)    |
| *Toninia candida*   | Lecanorales | NO, Buskerud, 2014, E. Timdal | O-L-196069 | OLICH1885-14 | MG838163 | triterpenoid (minor)    |
| *Toninia candida*   | Lecanorales | NO, Buskerud, 2011, K.A. Lye & T. Høitomt | O-L-177883 | OLICH557-13 | MG838185 | triterpenoid (minor)    |
| *Toninia coelestina* | Lecanorales | NO, Nordland, 2010, J.T. Klepsland | O-L-175215 | OLICH285-13 | MG838190 | triterpenoid (minor)    |
| *Toninia nordlandica* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195601 | OLICH1537-14 | MG838198 | triterpenoid (minor)    |
| *Toninia nordlandica* | Lecanorales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184351 | OLICH552-13 | MG838159 | triterpenoid (minor)    |
| *Toninia opuntioides* | Lecanorales | NO, Finnmark, 2014, E. Timdal | O-L-195603 | OLICH1539-14 | MG838192 | triterpenoid (minor)    |
| *Toninia opuntioides* | Lecanorales | NO, Oppland, 2011, J.T. Klepsland | O-L-183630 | OLICH559-13 | MG838168 | triterpenoid (minor)    |
| Species         | Order          | Voucher                           | Sample ID   | Process ID  | GenBank ID  | Chemistry                      |
|-----------------|----------------|-----------------------------------|-------------|-------------|-------------|--------------------------------|
| *Toninia*       | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184387  | OLICH635-13 | MG838172    | triterpenoid (possible trace)  |
| *opuntioides*   |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Oppland, 2011, J.T. Klepsland  | O-L-183757  | OLICH784-13 | MG838158    |                                |
| *opuntioides*   |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Nord-Trøndelag, 2011, J.T. Klepsland | O-L-177141  | OLICH1323-14 | MG838195    |                                |
| *rosulata*      |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Finnmark, 2014, E. Timdal      | O-L-195599  | OLICH1536-14 | MG838193    |                                |
| *sedifolia*     |                |                                   |             |             |             | no lichen substances           |
| *Toninia*       | Lecanorales    | NO, Aust-Agder, 2010, J.T. Klepsland | O-L-183585  | OLICH558-13 | MG838201    |                                |
| *sedifolia*     |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184381  | OLICH637-13 | MG838196    |                                |
| *sedifolia*     |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184332  | OLICH817-13 | MG838162    |                                |
| *squalida*      | Lecanorales    | NO, Oppland, 2011, R. Haugan & E. Timdal | O-L-169774  | OLICH553-13 | MG838183    |                                |
| *squalida*      |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Oppland, 2012, H. Bratli & R. Haugan | O-L-182301  | OLICH554-13 | MG838182    |                                |
| *squalida*      |                |                                   |             |             |             |                                |
| *Toninia*       | Lecanorales    | NO, Hordaland, 2013, E. Timdal     | O-L-184426  | OLICH638-13 | MG838181    |                                |
| *squalida*      |                |                                   |             |             |             |                                |
| Species                     | Order          | Voucher                      | Sample ID | Process ID | GenBank ID | Chemistry                        |
|-----------------------------|----------------|------------------------------|-----------|------------|------------|----------------------------------|
| *Toninia squalida*          | Lecanorales    | NO, Sør-Trøndelag, 2013, E. Timdal | O-L-184539 | OLICH639-13 | MG838200 | gyrophoric acid, lecanoric acid |
| *Toninia taurica*           | Lecanorales    | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184333 | OLICH546-13 | MG838174 |                                   |
| *Toninia verrucarioides*    | Lecanorales    | NO, Oppland, 2011, J.T. Klepsland | O-L-184389 | OLICH641-13 | MG838167 |                                   |
| *Toninia verrucarioides*    | Lecanorales    | NO, Oppland, 2011, J.T. Klepsland | O-L-183717 | OLICH850-13 | MG838179 |                                   |
| *Trapelia coarctata*        | Trapeliales    | NO, Oslo, 2014, J.T. Klepsland | O-L-200174 | OLICH3316-16 | MK812584 |                                   |
| *Trapelia coarctata*        | Trapeliales    | NO, Hedmark, 2012, R. Haugan et al. | O-L-182063 | OLICH562-13 | MK812526 |                                   |
| *Trapelia coarctata*        | Trapeliales    | NO, Telemark, 2012, E. Timdal | O-L-179924 | OLICH563-13 | MK812177 |                                   |
| *Trapelia corticola*        | Trapeliales    | NO, Nord-Trøndelag, 2011, H. Holien | TRH-L-14083 | OLICH993-13 | MK811911 |                                   |
| *Trapelia placodioide*      | Trapeliales    | NO, Nord-Trøndelag, 2012, R. Haugan | O-L-183857 | OLICH1324-14 | MK812664 |                                   |
| *Trapelia placodioide*      | Trapeliales    | NO, Telemark, 1996, H. Bratli & E. Timdal | O-L-20869 | OLICH3976-17 | MK812430 |                                   |
| *Trapelia placodioide*      | Trapeliales    | NO, Hedmark, 2015, R. Haugan | O-L-204154 | OLICH4366-17 | MK812690 | gyrophoric acid, lecanoric acid |
| Species                | Order       | Voucher               | Sample ID | Process ID   | GenBank ID | Chemistry |
|------------------------|-------------|-----------------------|-----------|--------------|------------|-----------|
| *Trapelia placodioides*| Trapeliales | NO, Oslo, 2014, J.T. Klepsland | O-L-200245 | OLICH4453-17 | MK812050   |           |
| *Trapelia placodioides*| Trapeliales | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184337 | OLICH548-13  | MK812359   |           |
| *Trapelia placodioides*| Trapeliales | NO, Oppland, 2012, S. Rui & E. Timdal | O-L-179918 | OLICH569-13  | MK812043   |           |
| *Trapeliopsis flexuosa*| Trapeliales | NO, Nord-Trøndelag, 2013, H. Holien | TRH-L-15151 | OLICH994-13  | MK811801   |           |
| *Trapeliopsis granulosa*| Trapeliales | NO, Sør-Trøndelag, 2007, E. Timdal | O-L-158481 | OLICH565-13  | MK812609   |           |
| *Trapeliopsis granulosa*| Trapeliales | NO, Oslo, 2011, R. Haugan | O-L-177342 | OLICH566-13  | MK811943   |           |
| *Trapeliopsis granulosa*| Trapeliales | NO, Troms, 2011, J.T. Klepsland | O-L-177175 | OLICH567-13  | MK812708   |           |
| *Trapeliopsis granulosa*| Trapeliales | NO, Finnmark, 2011, E. Timdal | O-L-170698 | OLICH568-13  | MK812198   |           |
| *Trapeliopsis granulosa*| Trapeliales | NO, Nord-Trøndelag, 2013, H. Holien | TRH-L-15150 | OLICH995-13  | MK812377   |           |
| *Trapeliopsis pseudogranulosa*| Trapeliales | NO, Telemark, 2015, E. Timdal | O-L-208001 | OLICH3875-17 | MK812568   |           |
| *Trapeliopsis pseudogranulosa*| Trapeliales | NO, Rogaland, 2011, J.T. Klepsland | O-L-183692 | OLICH852-13  | MK812270   |           |
| Species                  | Order            | Voucher           | Sample ID       | Process ID       | GenBank ID | Chemistry |
|-------------------------|------------------|-------------------|----------------|------------------|------------|-----------|
| *Tremolecia atrata*     | Hymeneliales     | NO, Sør-Trøndelag, 2012, M. Bendiksby et al. | O-L-179677     | OLICH4017-17    | MK812298   |           |
| *Tremolecia atrata*     | Hymeneliales     | NO, Finnmark, 2011, E. Timdal | O-L-170578     | OLICH606-13     | MK811647   |           |
| *Tremolecia atrata*     | Hymeneliales     | NO, Finnmark, 2011, E. Timdal | O-L-170776     | OLICH607-13     | MK812097   |           |
| *Tuckermanopsis chlorophylla* | Lecanorales | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196001     | OLICH1846-14    | MK811914   |           |
| *Tuckermanopsis chlorophylla* | Lecanorales | NO, Akershus, 2014, S. Rui & E. Timdal | O-L-196329     | OLICH2260-15    | MK812387   |           |
| *Umbilicaria arctica*   | Umbilicariales   | NO, Finnmark, 2014, E. Timdal | O-L-195898     | OLICH1743-14    | KY266911   |           |
| *Umbilicaria arctica*   | Umbilicariales   | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200892     | OLICH2545-16    | MK812428   |           |
| *Umbilicaria arctica*   | Umbilicariales   | NO, Aust-Agder, 2016, S. Rui & E. Timdal | O-L-204983     | OLICH4016-17    | MK812268   |           |
| *Umbilicaria cinereorufescens* | Umbilicariales | NO, Buskerud, 2014, E. Timdal | O-L-195830     | OLICH2202-15    | MK811655   |           |
| *Umbilicaria cinereorufescens* | Umbilicariales | NO, Oppland, 2015, E. Timdal | O-L-201349     | OLICH2734-16    | MK812545   |           |
| *Umbilicaria crustulosa* | Umbilicariales   | NO, Hordaland, 2014, E. Timdal | O-L-195804     | OLICH1676-14    | MK811776   |           |
| Species       | Order         | Voucher                  | Sample ID  | Process ID    | GenBank ID   | Chemistry |
|--------------|---------------|--------------------------|------------|---------------|--------------|-----------|
| *Umbilicaria* | *Umbilicariales* | NO, Buskerud, 2015, S. Rui & E. Timdal | O-L-200941 | O-LICH2662-16 | MK812060 |           |
| *cylindrica*  |               | NO, Hordaland, 2014, E. Timdal | O-L-195808 | O-LICH1680-14 | MK811748 |           |
| *deusta*      | *Umbilicariales* | NO, Finnmark, 2014, H. Holien | O-L-195872 | O-LICH1717-14 | KY266907 |           |
| *decussata*   | *Umbilicariales* | NO, Sør-Trøndelag, 2014, H. Holien | O-L-195957 | O-LICH1802-14 | KY266835 |           |
| *dendrophora* | *Umbilicariales* | NO, Sør-Trøndelag, 2013, M. Stapnes Dahl et al. | O-L-184711 | O-LICH929-13  | MK812153 |           |
| *dendrophora* | *Umbilicariales* | NO, Oppland, 2015, E. Timdal | O-L-201367 | O-LICH2744-16 | MK812686 |           |
| *deusta*      | *Umbilicariales* | NO, Finnmark, 2014, E. Timdal | O-L-195766 | O-LICH1638-14 | KY266862 |           |
| *deusta*      | *Umbilicariales* | NO, Telemark, 2014, E. Timdal | O-L-195790 | O-LICH1662-14 | MK812011 |           |
| Species          | Order         | Voucher      | Sample ID    | Process ID      | GenBank ID | Chemistry |
|------------------|---------------|--------------|--------------|-----------------|------------|-----------|
| *Umbilicaria*    | *Umbilicariales* | NO, Vestfold, 2015, E. Timdal | O-L-198940   | OLICH2493-16    | MK812096   |           |
| *deusta*         |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184712   | OLICH930-13     | MK812412   |           |
| *deusta*         |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200930   | OLICH2556-16    | MK812376   |           |
| *havaasii*       |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196282   | OLICH2212-15    | MK812437   |           |
| *hirsuta*        |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Vestfold, 2015, E. Timdal | O-L-198937   | OLICH2490-16    | MK811754   |           |
| *hirsuta*        |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Oppland, 2015, E. Timdal | O-L-201350   | OLICH2735-16    | MK812136   |           |
| *hirsuta*        |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Hordaland, 2014, E. Timdal | O-L-195803   | OLICH1675-14    | MK812311   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Finnmark, 2014, R. Haugan | O-L-195879   | OLICH1724-14    | KY266918   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Finnmark, 2014, R. Haugan | O-L-195925   | OLICH1770-14    | KY266976   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Finnmark, 2014, E. Timdal | O-L-195971   | OLICH1816-14    | KY266928   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Troms, 2014, E. Timdal | O-L-195656   | OLICH1996-15    | MK812016   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| *Umbilicaria*    | *Umbilicariales* | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184713   | OLICH931-13     | MK811931   |           |
| *hyperborea*     |               |              |              |                 |            |           |
| Species                  | Order               | Voucher                          | Sample ID | Process ID | GenBank ID | Chemistry                  |
|-------------------------|---------------------|----------------------------------|-----------|------------|------------|----------------------------|
| *Umbilicaria lyngei*    | Umbilicariales      | NO, Sør-Trøndelag, 2000, B. P. Løfall | O-L-78093 | OLICH4074-17 | MK812368   | no lichen substances       |
| *Umbilicaria lyngei*    | Umbilicariales      | NO, Oppland, 2009, R. Haugan     | O-L-159920 | OLICH4075-17 | MK812559   |                            |
| *Umbilicaria lyngei*    | Umbilicariales      | NO, Sør-Trøndelag, 2014, J.T. Klepsland | O-L-200558b | OLICH4096-17 | MK811698   |                            |
| *Umbilicaria nylanderiana* | Umbilicariales     | NO, Hedmark, 2015, M. Stapnes Dahl et al. | O-L-201305 | OLICH2670-16 | MK812167   |                            |
| *Umbilicaria nylanderiana* | Umbilicariales     | NO, Hedmark, 2016, E. Timdal      | O-L-201508 | OLICH3983-17 | MK812209   |                            |
| *Umbilicaria nylanderiana* | Umbilicariales     | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184729 | OLICH950-13   | MK812316   |                            |
| *Umbilicaria polyrrhiza* | Umbilicariales      | NO, Oslo, 2014, E. Timdal         | O-L-199999 | OLICH1973-15 | MK812126   |                            |
| *Umbilicaria polyrrhiza* | Umbilicariales      | NO, Østfold, 2013, R. Braathen & E.W. Hanssen | O-L-201768 | OLICH2595-16 | MK812352   |                            |
| *Umbilicaria polyrrhiza* | Umbilicariales      | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208345 | OLICH4384-17 | MK812239   |                            |
| *Umbilicaria proboscidea* | Umbilicariales     | NO, Finnmark, 2014, H. Holien     | O-L-195719 | OLICH1591-14 | KY266839   |                            |
| *Umbilicaria proboscidea* | Umbilicariales     | NO, Troms, 2014, E. Timdal        | O-L-195772 | OLICH1644-14 | MK811704   |                            |
| Species               | Order              | Voucher                           | Sample ID | Process ID | GenBank ID | Chemistry |
|----------------------|--------------------|-----------------------------------|-----------|------------|------------|-----------|
| *Umbilicaria*        | *Umbilicariales*   | NO, Finnmark, 2014, R. Haugan     | O-L-195923 | OLICH1768-14 | KY266848  |           |
| *proboscidea*        |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Finnmark, 2014, A. Millanes   | O-L-195936 | OLICH1781-14 | KY266966  |           |
| *proboscidea*        |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Sør-Trøndelag, 2014, E. Timdal| O-L-196361 | OLICH1920-15 | MK812366  |           |
| *proboscidea*        |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Buskerud, 2014, S. Rui & E. Timdal | O-L-196322 | OLICH2252-15 | MK812345  |           |
| *rigida*             |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | SE, Torne Lappmark, 2014, E. Timdal | O-L-195668 | OLICH2005-15 | MK812082  |           |
| *rigida*             |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Møre og Romsdal, 2015, R. Haugan | O-L-203950 | OLICH4077-17 | MK811777  |           |
| *spodochroa*         |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Vestfold, 2015, E. Timdal     | O-L-198938 | OLICH2491-16 | MK812519  |           |
| *torrefacta*         |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Troms, 2014, E. Timdal        | O-L-195634 | OLICH1553-14 | MK812116  |           |
| *torrefacta*         |                    |                                   |           |            |            |           |
| *Umbilicaria*        | *Umbilicariales*   | NO, Finnmark, 2014, E. Timdal     | O-L-195843 | OLICH1688-14 | KY266942  |           |
| *vellea*             |                    |                                   |           |            |            |           |
| Species          | Order         | Voucher                  | Sample ID | Process ID  | GenBank ID  | Chemistry                          |
|------------------|---------------|--------------------------|-----------|-------------|-------------|------------------------------------|
| *Umbilicaria*    | Umbilicariales| NO, Møre og Romsdal, 2015, R. Haugan | O-L-203963 | OLICH3162-16 | MK812576    |                                    |
| *Umbilicaria*    | Umbilicariales| NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184699 | OLICH1411-14 | MK812140    |                                    |
| *Usnea dasypoga* | Lecanorales   | NO, Telemark, 2014, E. Timdal | O-L-196273 | OLICH1947-15 | MK812173    |                                    |
| *Usnea dasypoga* | Lecanorales   | NO, Oslo, 2014, E. Timdal | O-L-200005 | OLICH1979-15 | MK812052    |                                    |
| *Usnea flammea*  | Lecanorales   | NO, Vest-Agder, 2013, J.T. Klepsland | O-L-197827 | OLICH2127-15 | MK811847    | constictic acid, stictic acid, usnic acid |
| *Usnea fragilescens* | Lecanorales   | NO, Rogaland, 2014, J.T. Klepsland | O-L-200604 | OLICH2634-16 | MK812021    |                                    |
| *Usnea subfloridana* | Lecanorales   | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184700 | OLICH1412-14 | MK811828    |                                    |
| *Usnea subfloridana* | Lecanorales   | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200814 | OLICH2585-16 | MK811766    |                                    |
| *Usnea subfloridana* | Lecanorales   | NO, Rogaland, 2014, J.T. Klepsland | O-L-200728 | OLICH2623-16 | MK812453    | thamnolic acid, usnic acid          |
| *Usnea wasmuthii* | Lecanorales   | NO, Sør-Trøndelag, 2013, J.T. Klepsland | O-L-198061 | OLICH2131-15 | MK812232    | barbatic acid, salazinic acid, usnic acid |
| *Usnea wasmuthii* | Lecanorales   | NO, Rogaland, 2013, J.T. Klepsland | O-L-197890 | OLICH2132-15 | MK812501    | barbatic acid, usnic acid          |
| *Varicellaria lactea* | Pertusariales | NO, Oppland, 2015, R. Haugan | O-L-204064 | OLICH4380-17 | MK812539    | lecanoric acid, variolaric acid     |
| Species                 | Order              | Voucher                  | Sample ID | Process ID      | GenBank ID | Chemistry               |
|------------------------|--------------------|--------------------------|-----------|-----------------|------------|-------------------------|
| *Variospora flavescens* | Teloschistales     | NO, Rogaland, 2014, J.T. Klepsland | O-L-200626 | OLICH4054-17   | MK812667   |                         |
| *Variospora thallincola* | Teloschistales     | NO, Rogaland, 2014, J.T. Klepsland | O-L-200631 | OLICH4056-17   | MK812547   |                         |
| *Verrucaria tenebrosa* | Verrucariales      | No, Nord-Trøndelag, 2015, J. Pykälä 48333 | H-WG2_2130 | OLICH2807-16   | KY682961   |                         |
| *Vulpicida juniperinus* | Lecanorales        | NO, Oppland, 2013, M. Bendiksby et al. | O-L-184298 | OLICH1406-14   | MK812148   |                         |
| *Vulpicida juniperinus* | Lecanorales        | NO, Nord-Trøndelag, 2015, R. Haugan | O-L-201311 | OLICH3857-17   | MK812404   |                         |
| *Vulpicida juniperinus* | Lecanorales        | NO, Sør-Trøndelag, 2017, E. Timdal | O-L-208203 | OLICH4356-17   | MK812500   |                         |
| *Vulpicida pinastri*   | Lecanorales        | NO, Finnmark, 2014, H. Holien | O-L-195944 | OLICH1789-14   | KY266954   |                         |
| *Vulpicida pinastri*   | Lecanorales        | NO, Telemark, 2015, S. Rui & E. Timdal | O-L-200937 | OLICH2563-16   | MK811933   |                         |
| *Vulpicida pinastri*   | Lecanorales        | NO, Buskerud, 2013, S. Rui & E. Timdal | O-L-184701 | OLICH883-13    | MK812364   | pinastic acid, vulpinic acid |
| *Xanthomendoza borealis* | Teloschistales    | NO, Sør-Trøndelag, 2014, E. Timdal | O-L-196336 | OLICH2274-15   | MK812442   |                         |
| *Xanthomendoza borealis* | Teloschistales    | NO, Oppland, 2013, J.T. Klepsland | O-L-198333 | OLICH2359-15   | MK811659   |                         |
| Species             | Order        | Voucher                      | Sample ID | Process ID   | GenBank ID | Chemistry |
|---------------------|--------------|------------------------------|-----------|--------------|------------|-----------|
| *Xanthomendoza fulva* | Teloschistales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196295 | OLICH2225-15 | MK812265   |           |
| *Xanthomendoza fulva* | Teloschistales | NO, Hedmark, 2006, B. P. Løfall et al. | O-L-147714 | OLICH4440-17 | MK812487   |           |
| *Xanthomendoza fulva* | Teloschistales | NO, Sogn og Fjordane, 2012, B. Nordén & J.B. Jordal | O-L-199397 | OLICH4442-17 | MK811973   |           |
| *Xanthoparmelia conspersa* | Lecanorales | NO, Telemark, 2014, S. Rui & E. Timdal | O-L-196278 | OLICH1951-15 | MK812598   |           |
| *Xanthoparmelia conspersa* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196296 | OLICH2226-15 | MK812585   |           |
| *Xanthoparmelia conspersa* | Lecanorales | NO, Rogaland, 2016, S. Rui & E. Timdal | O-L-204999 | OLICH3992-17 | MK812248   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Akershush, 2014, E. Timdal | O-L-199990 | OLICH1964-15 | MK811808   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Vestfold, 2014, S. Rui & E. Timdal | O-L-196281 | OLICH2211-15 | MK811902   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Aust-Agder, 2013, J.T. Klepsland | O-L-198317 | OLICH2375-16 | MK811982   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Østfold, 2012, K.A. Lye | O-L-206876 | OLICH4133-17 | MK812427   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208018 | OLICH4190-17 | MK812543   |           |
| *Xanthoparmelia loxodes* | Lecanorales | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208343 | OLICH4272-17 | MK812627   |           |
| Species                  | Order        | Voucher | Sample ID     | Process ID | GenBank ID | Chemistry          |
|-------------------------|--------------|---------|---------------|------------|------------|--------------------|
| *Xanthoparmelia* protomatrae | Lecanorales  | NO, Aust-Agder, 2015, H. Riddervold | O-L-201574 | O-LICH3243-16 | MK812594 |                  |
| *Xanthoparmelia* pulla   | Lecanorales  | NO, Sør-Trøndelag, 2014, R. Haugan | O-L-196012 | O-LICH1857-14 | MK812429 |                  |
| *Xanthoparmelia* pulla   | Lecanorales  | NO, Østfold, 2016, S. Rui & E. Timdal | O-L-208019 | O-LICH4191-17 | MK812706 |                  |
| *Xanthoparmelia* pulla   | Lecanorales  | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208344 | O-LICH4273-17 | MK812285 |                  |
| *Xanthoparmelia* stenophylla | Lecanorales  | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208338 | O-LICH4268-17 | MK811834 |                  |
| *Xanthoparmelia* tinctina | Lecanorales  | SE, Bohuslän, 2012, E. Timdal | O-L-184585 | O-LICH3233-16 | MK812507 |                  |
| *Xanthoparmelia* tinctina | Lecanorales  | NO, Østfold, 2017, S. Rui & E. Timdal | O-L-208333 | O-LICH4264-17 | MK812642 |                  |
| *Xanthoparmelia* verruculifera | Lecanorales  | NO, Oppland, 2015, E. Timdal | O-L-201346 | O-LICH2731-16 | MK812281 |                  |
| *Xanthoria* parietina    | Teloschistales | NO, Telemark, 2014, E. Timdal | O-L-195782 | O-LICH1654-14 | MK812349 |                  |
| *Xanthoria* parietina    | Teloschistales | NO, Oslo, 2014, M. Bendiksby et al. | O-L-196081 | O-LICH1897-14 | MK812134 |                  |
| *Xanthoria* parietina    | Teloschistales | NO, Østfold, 2012, K.A. Lye | O-L-206852 | O-LICH4143-17 | MK811702 |                  |
| *Xylographa* parallela   | Trapeliales  | NO, Finnmark, 2011, E. Timdal | O-L-170700 | O-LICH3294-16 | MK812221 | no lichen substances |
Temporal coverage

**Notes:** The sampled material was collected in the period 1995–2017, with 90% being after 2010 and with a peak of 532 specimens in 2014 (Fig. 3).

![Figure 3. doi](dx.doi.org/10.5883/DS-OLICH)

Distribution of year of collection of the specimens in the OLICH dataset

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Data resources

**Data package title:** DNA barcodes of Nordic lichens

**Resource link:** [dx.doi.org/10.5883/DS-OLICH](dx.doi.org/10.5883/DS-OLICH)

**Number of data sets:** 1

**Data set name:** DS-OLICH
Download URL:  http://www.boldsystems.org/index.php/Public_SearchTerms?query=DS-OLICH

Data format:  dwc, xml, tsv, fasta, trace

Description:  The OLICH dataset can be downloaded from the Public Data Portal of BOLD (www.boldsystems.org) in different formats (data as dwc, xml or tsv, sequences as fasta and trace files as trace). Alternatively, BOLD users can log in and access the dataset via the Workbench platform of BOLD. All records are also searchable within BOLD using the search function of the database.

Depending on future funding, the OLICH project will continue sequencing Nordic lichens for the BOLD database, with the ultimate (although unrealistic) goal of complete coverage. Hence, the dataset will be updated in the future with new sequences and information. The version of the dataset at the time of writing the manuscript is included as Suppl. materials 1, 2, 3, 4 in the form of two text files for record information as downloaded from BOLD, one text file with the collecting and identification data in Darwin Core Standard format (downloaded from BOLD and formatted by the authors) and of a fasta file containing all sequences as downloaded from BOLD.

It should be noted that, as the BOLD database is not compliant with the Darwin Core Standard format, the Darwin Core formatted file (dwc) that can be downloaded from BOLD is not strictly Darwin Core formatted. For a proper Darwin Core formatted file, see Suppl. material 3.

All records have images and geographical coordinates in BOLD.

Column labels below follow the labels downloaded in the tsv format. Columns with no content in our dataset are left out in the list below.

| Column label   | Column description                                                                 |
|----------------|-----------------------------------------------------------------------------------|
| processid      | Unique identifier for the sample                                                  |
| sampleid       | Unique identifier for the voucher specimen, i.e. museum catalogue number in either lichen herbarium or DNA bank at the Natural History Museum, University of Oslo |
| recordID       | Entry number in the database                                                      |
| catalognum     | Same as sampleid; Unique identifier for the voucher specimen, i.e. museum catalogue number in either lichen herbarium or DNA bank at the Natural History Museum, University of Oslo |
| institution_storing | The full name of the institution where specimen is stored                          |
| phylum_taxID   | Taxonomic identifier of level Phylum                                              |
| phylum_name    | Phylum name                                                                        |
| class_taxID    | Taxonomic identifier of level Class                                                |
| class_name     | Class name                                                                         |
| Parameter                  | Description                                                                 |
|----------------------------|-----------------------------------------------------------------------------|
| order_taxID                | Taxonomic identifier of level Order                                          |
| order_name                 | Order name                                                                  |
| family_taxID               | Taxonomic identifier of level Family                                         |
| family_name                | Family name                                                                 |
| genus_taxID                | Taxonomic identifier of level Genus                                          |
| genus_name                 | Genus name                                                                  |
| species_taxID              | Taxonomic identifier of level Species                                        |
| species_name               | Species name                                                                |
| identification_provided_by | Name of primary individual responsible for providing taxonomic identification of the specimen |
| identification_method      | The method(s) used to identify the specimen                                  |
| identification_reference   | Authorship of species name                                                   |
| voucher_status             | Status of the specimen in an accessioning process                           |
| tissue_type                | A brief description of the type of tissue analysed                           |
| collectors                 | Name(s) of the individual(s) responsible for collecting the sample in the field |
| habitat                    | A description of the habitat                                                 |
| Notes                      | Notes regarding species identification of the specimen or other note concerning the specimen. |
| lat                        | The geographical latitude (in decimal degrees) of the geographic centre of a location |
| long                       | The geographical longitude (in decimal degrees) of the geographic centre of a location |
| coord_accuracy             | An estimation of the uncertainty of the coordinates given in the lat and long columns (metres) |
| elev                       | Elevation of sampling site. Measured in metres relative to sea level.        |
| country                    | Name of country in which the organism was collected                           |
| province_state             | Name of the province (in Norway "fylke") in which the organism was collected |
| region                     | Name of municipality in which the organism was collected                      |
| exactsite                  | Name of exact locality where the organism was collected                       |
| image_ids                  | Entry number in the database                                                 |
| image_urls                 | URL(s) from which the image(s) of the organism(s) can be accessed            |
| media_descriptors          | Term depicting, in this case, side of organism photographed, i.e. dorsal     |
| captions                   | Short description of part of organism photographed                           |
| copyright_years            | The year of the licence declaration for the image                            |
Additional information

Summary statistics and genetic distances

The dataset contains on average 2.6 records per species, ranging from one (184 species) to 12 (one species) records per species. Average sequence length was 541 bp (including sequences that did not include the whole ITS region due to unreadable trace files). The shortest sequence in the dataset was an incomplete sequence, 229 bp long. The species with the shortest complete ITS region was Haematomma ocrroleucum with 481 bp. The longest ITS region was 856 bp from Leptogium cochleatum. However, the two sequences of the latter species did not align with the others at the start of the sequence and it is possible that introns in the SSU rDNA are included.

We calculated intra- and interspecific genetic distances for the three genera with most sampled species and performed barcode gap analyses on those. Distances and key statistics are found in Table 2.

| Genus         | Ramalina | Umbilicaria | Cladonia |
|---------------|----------|-------------|----------|
| Number of species in genus in this dataset | 9        | 19          | 47       |
| Number of records | 26       | 52          | 122      |
| Average number of records per species | 2.9      | 2.7         | 2.6      |
| Average intraspecific distances | 0–1.3%   | 0–2.3%      | 0–3.4%   |
| Interspecific distances | 0.4–8.2% | 2.5–12.1%   | 0.2–15.6% |

In Ramalina, there was an overlap between intra- and interspecific distances (Table 2, Fig. 4a). The overlap is caused by the one species pair with higher maximum intraspecific distance than the distance to the nearest neighbour (Fig. 4b); i.e. R. farinacea had an intraspecific distance of 0.9% and a distance of 0.4% to R. subfarinacea. If this species pair is excluded from the distance-dataset, a barcode gap will occur at 2% (Fig. 4a).
OLICH: A reference library of DNA barcodes for Nordic lichens

Figure 4.
Genetic distances within the three lichen genera with most sampled species in the OLICH dataset.

a: Frequency distribution of intraspecific distances (blue) and interspecific distances (orange). A gap between intra- and interspecific distances illustrates the barcode gap in the genus. doi

b: Scatterplots representing maximum intraspecific distances versus minimum distance to closest neighbour for all species with more than one specimen per species, in each of the three genera. doi

c: Frequency distribution of intraspecific distances (blue) and interspecific distances (orange). A gap between intra- and interspecific distances illustrates the barcode gap in the genus. doi

d: Scatterplots representing maximum intraspecific distances versus minimum distance to closest neighbour for all species with more than one specimen per species, in each of the three genera. doi

e: Frequency distribution of intraspecific distances (blue) and interspecific distances (orange). A gap between intra- and interspecific distances illustrates the barcode gap in the genus. doi

f: Scatterplots representing maximum intraspecific distances versus minimum distance to closest neighbour for all species with more than one specimen per species, in each of the three genera. doi
For *Umbilicaria*, there were no species pairs with higher maximum intraspecific distance than the distance to the nearest neighbour, but one species had the same maximum intraspecific distance as the distance to the nearest neighbour, namely *U. proboscidea* whose closest neighbour was *U. virginis* (Fig. 4d). There is thus no barcode gap in our *Umbilicaria* dataset, as the intra- and interspecific distances overlaps around 3% (Fig. 4c).

Whereas *Ramalina* and *Umbilicaria*, despite the above-mentioned issues, show a tendency for displaying a barcode gap, *Cladonia* does not show the same pattern. There is no gap, but rather overlapping, smooth curves of intra- and interspecific distances in the barplot (Table 2, Fig. 4e). Most of the species pairs that disrupt the pattern are complexes where species are known to be sometimes difficult to distinguish with traditional characters and these are found below the line in Fig. 4f: *C. coniocraea/gracilis, C. maxima/ecmocyna* and *C. cenotea/subfurcata/crispata/squamosa*.

ITS has previously been shown to give poor resolution amongst *Cladonia* species (Fontaine et al. 2010, Kotelko and Piercey-Normore 2010, Pino-Bodas et al. 2013) and a lack of barcode gap has been demonstrated (Kelly et al. 2011). This probably has to do with their high morphological plasticity (Pino-Bodas et al. 2013) which may have led to erroneous identifications/taxonomy, but there might also be evolutionary explanations, such as incomplete lineage sorting (van Velzen et al. 2012).

**Observations**

From the phylogenetically and BLASTn based quality control, some specific taxonomic observations were made that are listed below.

*Alectoraria sarmentosa* (Ach.) Ach. ssp. *vexillifera* (Nyl.) D.Hawksw.: This subspecies is currently accepted in the Nordic flora (Velmala and Myllys 2011, Nordin et al. 2019). It differs morphologically from spp. *sarmentosa* in forming a more prostrate thallus with broader and more flattened main branches and, ecologically, in growing on the ground or on rocks mainly in coastal and alpine areas. Subspecies *sarmentosa* grows mainly on trunks and branches of conifers in boreal forests. Our sequence of spp. *vexillifera* (OLICH1478) is nested within our four sequences of spp. *sarmentosa*, however, which does not support the recognition of the subspecies (Fig. 5).

*Brodoa oroarctica* (Krog) Goward: The species differs from *B. atrofuscus* (Schaer.) Goward in the shape of the thallus and lobes and in the lack of physodic acid in most of the thallus except for in some lobe tips (Krog 1974). The former species is circumpolar arctic-alpine, with southernmost occurrences in Europe in the southern Scandinavian mountains, whereas the latter is a European species known mainly from the Alps and Pyrenees and with scattered occurrences in Northern Europe. Our four barcode sequences of *B. oroarctica* are however nested within the four sequences of *B. atrofuscus* (Fig. 6), and the complex seems to be in need of revision.
Bryobilimbia fissuriseda (Poelt) Timdal, Marthinsen & Rui, comb. nov.

Mycobank: MB 830330

Basionym: Lecidea fissuriseda Poelt, Mitteilungen der Botanischen Staatssammlung München 4: 181, 1961. ≡ Mycobilimbia fissuriseda (Poelt) Poelt & Hafellner, Herzogia 8: 56, 1989. Type: Switzerland, Berner Oberland, Gipfelgrader Niesen, Nordhänge, alt. 2300 m, 1955, Poelt B55189 (M!, holotype).
This rarely collected species was described from the Alps in the large, collective genus *Lecidea* Ach. (Poelt 1961). It was later transferred to the segregate genus *Mycobilimbia* Rehm by Poelt & Hafellner (in Hafellner 1989). Partly due to the presence of characteristic blue, K+ green granules in the hymenium and the hypothecium, Poelt (1961) and Timdal (1992) assumed it was closely related to *M. hypnorum* (Lib.) Kalb & Hafellner (syn. *Lecidea fusca* (Schaer.) Th. Fr.). Fryday et al. (2014), based on a molecular study, excluded *M. hypnorum* from *Mycobilimbia* and placed it, with four additional species, in the new genus *Bryobilimbia* Fryday et al. *Mycobilimbia fissuriseda* was not included in that study, but our phylogenetic tree, based on the DNA barcodes (Fig. 7), shows that it is, in fact, closely related to *B. diapensiae* and *B. hypnorum* and it is hence here transferred to *Bryobilimbia*.

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**Figure 7. doi**

Maximum likelihood tree of *Bryobilimbia* and *Mycobilimbia* based on all available ITS sequences. The presumably related genera *Clauzadea* and *Romjularia* are included and *Farnoldia* and *Lecidea* are used as the outgroup.
Bryoria capillaris (Ach.) Brodo & D.Hawksw.: The species is still accepted in the Nordic checklist (Nordin et al. 2019), despite several recent molecular phylogenies (Myllys et al. 2011, Velmala et al. 2014, Myllys et al. 2016, Boluda et al. 2019) showing it nested within Bryoria implexa (Hoffm.) Brodo & D. Hawksw. The OLICH dataset shows the same topography (Fig. 8): B. capillaris nested within B. implexa. However, all our specimens of the B. capillaris/implexa complex were identified by morphology prior to TLC analysis and the correlation holds: all pale specimens (B. capillaris) contain alectoriaic acid (plus accessories) and barbatolic acid, whereas no dark specimens (B. implexa) do. Fumarprotocetraric and protocetraric acids occur variably in both species. Either the DNA barcode marker and the other markers used in recent phylogenetic studies do not distinguish between two species which may be recognised by the correlation of thallus colour and secondary chemistry or the two “species” are conspecific and their morphological/chemical difference is caused by other factors. For example, the presence/absence of an additional symbiont (basidiomycete yeast) were found likely to trigger the production of vulpinic acid in the cortex of Bryoria fremontii/tortuosa by Spribille et al. (2016).

Cetrelia cetrarioides (Duby) W.L. Culb. & C.F. Culb. and C. monachorum (Zahlbr.) W.L. Culb. & C.F. Culb.: The three chemotypes of Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb. s. lat., currently recognised in the Nordic countries (Bjelland et al. 1997, Obermayer and Mayrhofer 2007, Nordin et al. 2019), were recently shown to represent three distinct species in the phylogenetic analysis by Mark et al. (2019). The diagnostic, main compounds of those species are imbricaric acid in C. monachorum, olivetoric acid in C. olivetorum s. str. and perlatalic acid in C. cetrarioides (Mark et al. 2019). The seven specimens sequenced in the OLICH project fell into the C. cetrarioides and C. monachorum clades (Fig. 9) and the TLC analyses of the sequenced specimens showed the chemotypes were in accordance with the species identifications (Table 1).
Hypotrachyna afrorevoluta (Krog & Swinscow) Krog & Swinscow: The species is morphologically and chemically quite similar to H. revoluta (Flörke) Hale and the OLICH sequences (Fig. 10) confirm the presence of the two species in the Nordic countries. See Elix and Thell (2011) for the subtile morphological differences between the species.

**Figure 9.**
Maximum likelihood tree of the OLICH sequences of *Cetrelia*, with selected ITS sequences from Mark et al. (2019).

**Figure 10.**
Maximum likelihood tree of the OLICH sequences of *Hypotrachyna afrorevoluta* and *H. revoluta*, with all available ITS sequences in GenBank.
**Nephroma tangeriense** (Maheu & A.Gillet) Zahlbr.: The species was recently reported as new to the Nordic countries (Klepsland 2013) from two collections from Rogaland county. The OLICH project has sequenced one of those (OLICH2019), as well as four additional collections from Hordaland and Vest-Agder counties and confirms its identity and distinction from *N. laevigatum* Ach. (Fig. 11).

**Peltigera “neocanina”**: BLASTn search revealed the identity of OLICH1878, which was originally identified as *P. canina* (L.) Willd., as *P. “neocanina”*. This is still an invalid name despite the taxon, which must be regarded as a morphologically cryptic species, has been known since the phylogenetic study of *Peltigera* by Miadlikowska and Lutzoni (2000). Jüriado et al. (2017) showed its presence in Estonia and Magain et al. (2018) in Norway.

**Pseudocyphellaria citrina** (Gyeln.) Lücking, Moncada & S. Stenroos: The *Pseudocyphellaria* species with yellow soralia, occurring in the Nordic countries, is currently named *P. crocata* (L.) Vain. (Nordin et al. 2019). Lücking et al. (2017b) showed that *P. crocata* was heterogeneous and split it into 13 species. European material was not included in that study and it remained unknown which species occurs in our area. The sequences obtained from three Norwegian specimens in the OLICH project all belong in the *P. citrina* clade of Lücking et al. (2017b) (Fig. 12).

**Psoroma cinnamomeum** Malme: The specimen from which OLICH702 was generated was originally identified as *Psoroma tenue* Henssen var. *boreale* Henssen, but BLASTn search against GenBank indicated its identity as *P. cinnamomeum*. A phylogenetic analysis, based on most of the ITS sequences of *Psoroma* in GenBank (including those used by Park et al. 2018), supported this identification as OLICH702 and came out in a strongly supported clade with the six other specimens of *P. cinnamomeum*, two of which

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Figure 11. Maximum likelihood tree based on the OLICH sequences of *Nephroma laevigatum* and *N. tangeriense*, with selected ITS sequences from GenBank.
are from southernmost Chile and four from Svalbard (Fig. 13). The clade was the sister of the strongly supported clade of the two specimens of *P. tenue* in GenBank, both from Antarctica. Both *P. cinnamomeum* and *P. tenue* were described from Tierra del Fuego, var. *boreale* from USA, Colorado (cf. Henssen and Renner 1981). OLICH702 contains porphyrilic acid and two unknown compounds (apparently related to porphyrilic acid due to the colour and fluorescence on the chromatograms) and hence fits the current concept of *P. tenue* var. *boreale* (cf. Jørgensen 2007). Unless molecular studies show that there are two morphologically very similar species in the Northern Hemisphere, both containing porphyrilic acid, we believe *P. cinnamomeum* is the correct name for the taxon currently known as *P. tenue* var. *boreale*.

Ramalina capitata (Ach.) Nyl.: The species has often been included in *R. polymorpha* (Lilj.) Ach. in the past (e.g. Krog and James 1977), but is now usually accepted as distinct (e.g. Nimis et al. 2018, Nordin et al. 2019). In our phylogeny (Fig. 14), Nordic and western European material of the two species are mostly well separated, but the four sequences from Turkey in GenBank are deviant and the complex seems to be in need of further study.

Ramalina subfarinacea (Cromb.) Nyl.: Our two sequences of this species, as well as the two ITS sequences available in GenBank, are nested in the clade of *Ramalina farinacea* (L.) Ach. in our phylogeny (Fig. 15). According to Krog and James (1977), there are subtle morphological differences between the species, but apparently the major distinguishing

![Figure 12.](image-url)
feature is the ecology: mainly on coastal rock (*R. subfarinacea*) vs. mainly on bark of deciduous, inland trees (*R. farinacea*). More study is needed in order to evaluate the taxonomic status of *R. subfarinacea*.

**Sticta fuliginoides** Magain & Sérus.: BLASTn search of the sequence of an originally identified *Sticta fuliginosa* (Hoffm.) Ach. (OLICH2638) showed 99.4–100% similarity with the five sequences of *S. fuliginoides* and 90.0–90.2% similarity with the 9 sequences of *S. fuliginosa* in the phylogeny of Magain and Serusiaux (2015). This confirms the presence of *S. fuliginoides* in the Nordic countries, as recently reported by Ekman et al. (2019), based on morphological characters.
Figure 15. doi

Maximum likelihood tree of the *Ramalina farinacea/subfarinacea* complex, based on all available ITS sequences.

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Supplementary materials

**Suppl. material 1: OLICH library - Processing details [doi]**

**Authors:** Gunnhild Marthinsen, Siri Rui, Einar Timdal  
**Data type:** Record information - processing details on ITS sequences  
**Brief description:** The file includes information about all records in BOLD for the OLICH library, i.e. the DS-OLICH dataset, at time of writing. It contains data on ITS sequences. The data are as downloaded from BOLD without further processing.  
[Download file](492.24 kb)

**Suppl. material 2: OLICH library - Specimen details [doi]**

**Authors:** Gunnhild Marthinsen, Siri Rui, Einar Timdal  
**Data type:** Record information - specimen data  
**Brief description:** The file includes information about all records in BOLD for the OLICH library, i.e. the DS-OLICH dataset, at time of writing. It contains collecting and identification data. The data are as downloaded from BOLD, without further processing.  
[Download file](492.24 kb)

**Suppl. material 3: OLICH library - Specimen details - Darwin Core Standard [doi]**

**Authors:** Gunnhild Marthinsen, Siri Rui, Einar Timdal  
**Data type:** Record information - specimen data in Darwin Core Standard format  
**Brief description:** The file includes information about all records in BOLD for the OLICH library, i.e. the DS-OLICH dataset, at time of writing. It contains collecting and identification data. The data are downloaded from BOLD and further formatted to the DC standard by the authors.  
[Download file](529.67 kb)
Suppl. material 4: OLICH library - DNA sequences [doi]

Authors: Gunnhild Marthinsen, Siri Rui, Einar Timdal

Data type: Genomic data, DNA sequences

Brief description: ITS sequences in fasta format. Each sequence is identified by the BOLD ProcessID and species name, separated by pipe. The data are as downloaded from BOLD.

Download file (945.98 kb)