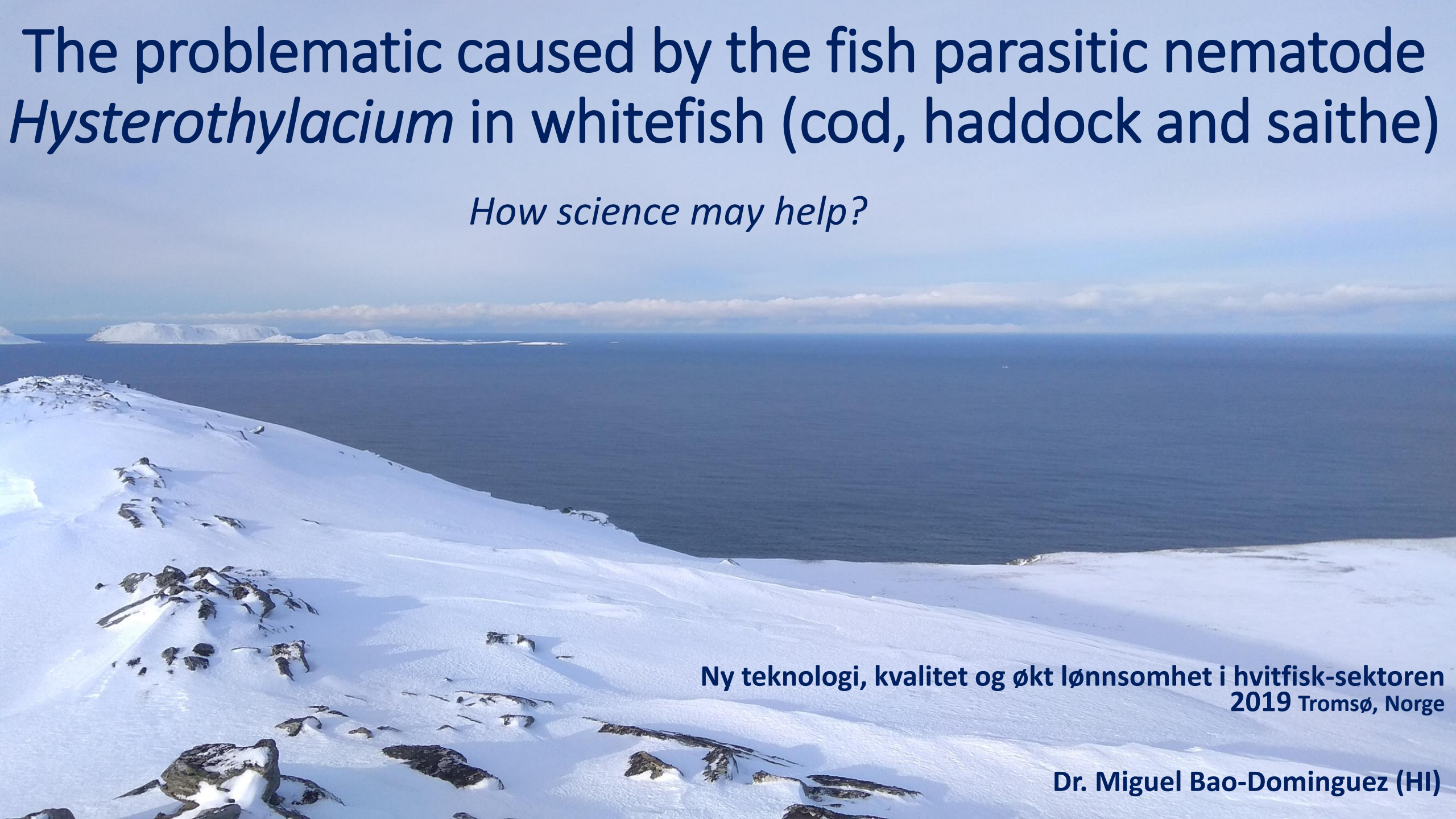
The problematic caused by the fish parasitic nematode *Hysterothylacium* in whitefish (cod, haddock and saithe)

How science may help?



Ny teknologi, kvalitet og økt lønnsomhet i hvitfisk-sektoren
2019 Tromsø, Norge

Dr. Miguel Bao-Dominguez (HI)

Background

Norwegian cod supplier

Spanish client

Big & live worms
over the fish & box!

We need a project!

Scientific advice (HI)

What is this worm?
Is it dangerous to humans?
What can we do to eliminate the problem?
.
.
.

Fish lots rejected

"*Hysterothylacium* crisis"

Objective

FHF prosjekt nr. 901543 - *Økt kunnskap om Hysterothylacium aduncum i torsk, sei og hyse i norske farvann med praktiske preventive tiltak*

Financed by: FHF

carried out by

The main objectives of the project are:

1. To suggest improved fish handling procedures that may prevent future problems caused by the parasite.

2. To determine the infection levels and anatomical location of *Hysterothylacium* in cod, haddock and saithe from Barents Sea in two different periods (“winter” and “spring”).

3. To assess parasite survival through time mimicking fish transport and storage conditions.

Introduction

Hysterothylacium aduncum - fish parasitic nematode of the family Raphidascarididae

Complex and unresolved life cycles in the marine environment

Why this parasite is important?

Considered <u>non-pathogenic</u> to humans:

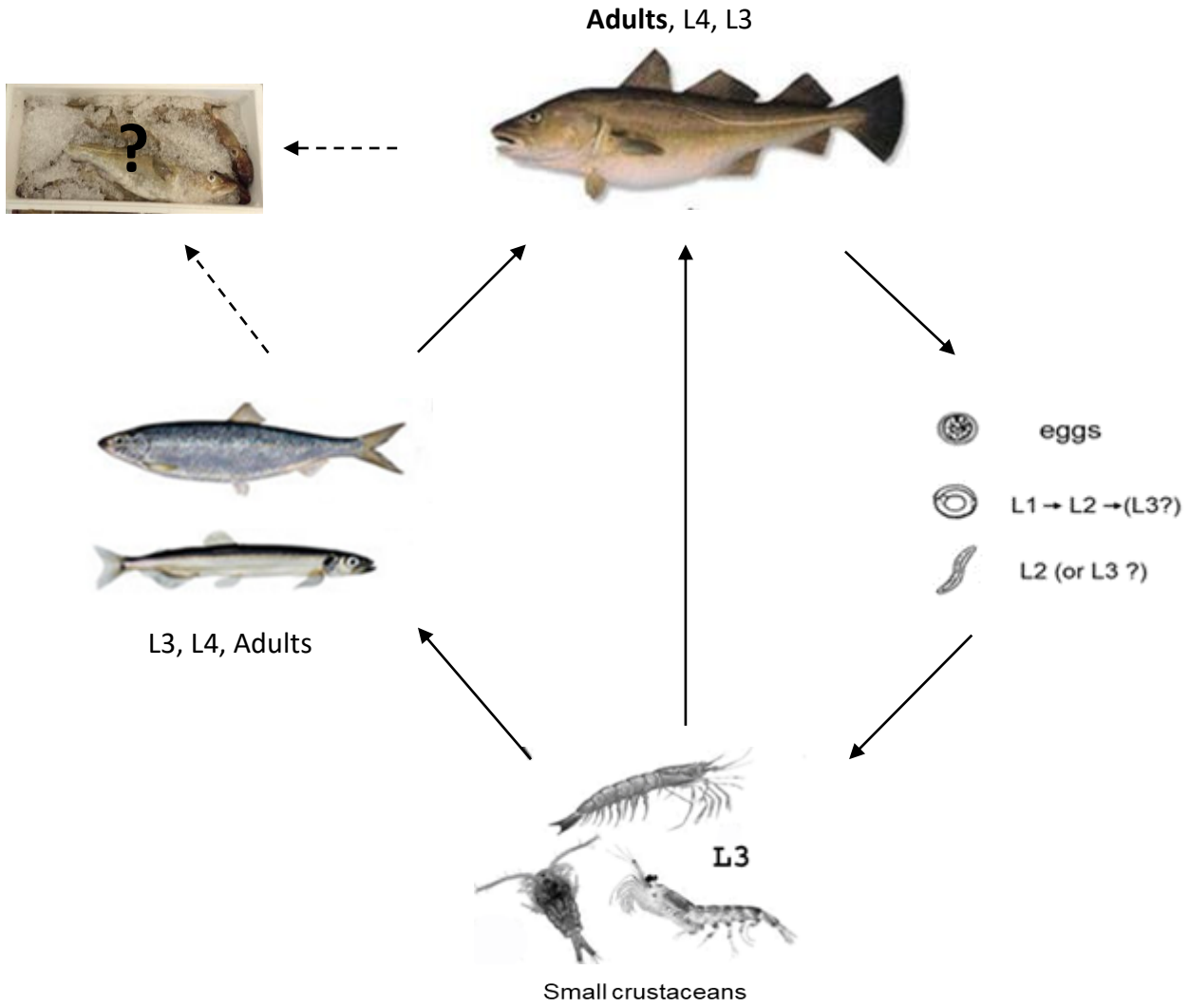
✓ Parasite of cold-blooded organisms (i.e. fish)

BUT

Socioeconomic implications (**<u>food quality issue</u>**)

- Rejection of fish lots
- Consumer distrust in fishery products
- Economic losses to the fishing industry

Possible life cycle in the Barents Sea



Methods

Visual inspection

Cod (“skrei”)

Haddock (“hyse”)

Saithe (“sei”)

Necropsy

Skin

Mouth/pharynx

Gills

Muscle

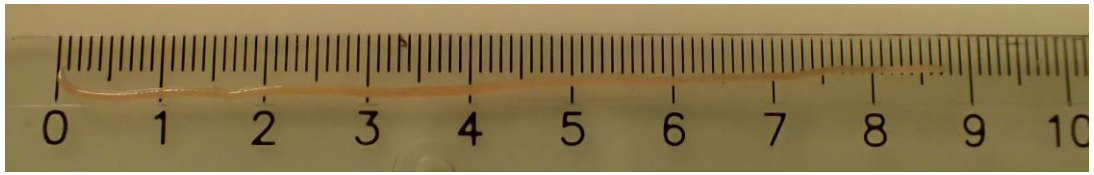
Viscera → L3 larval stage location in live fish

Stomach → **Adult** and L4 larval stage locations in live fish (big worms!)

Intestine → **Adult** and L4 larval stage locations in live fish (big worms!)

Microscopy (identification to species level)

Anterior body part of *Hysterothylacium aduncum*



Preliminary results

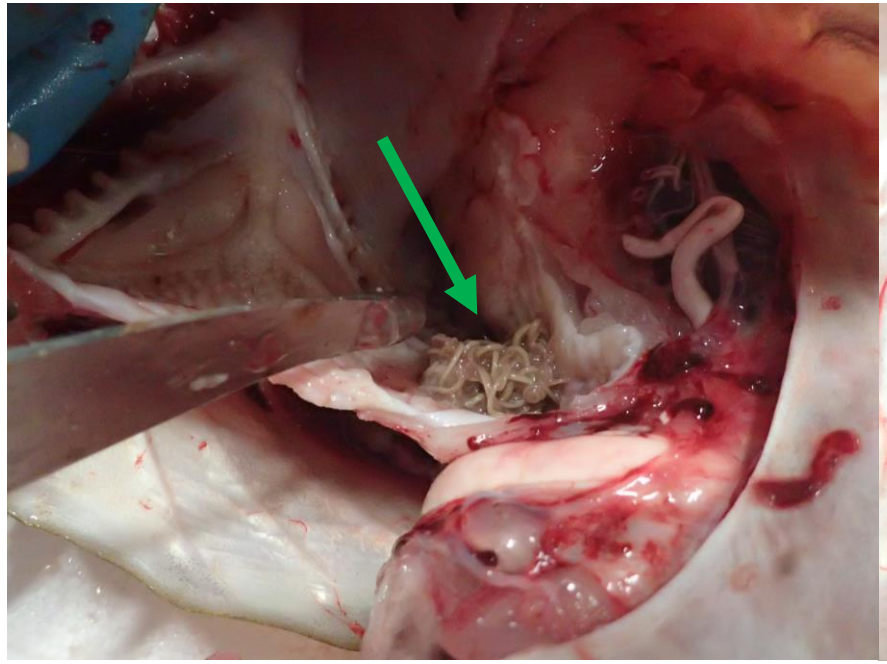
COD (n= 10) at factory (West-Finnmark)

Date: 13/3/19

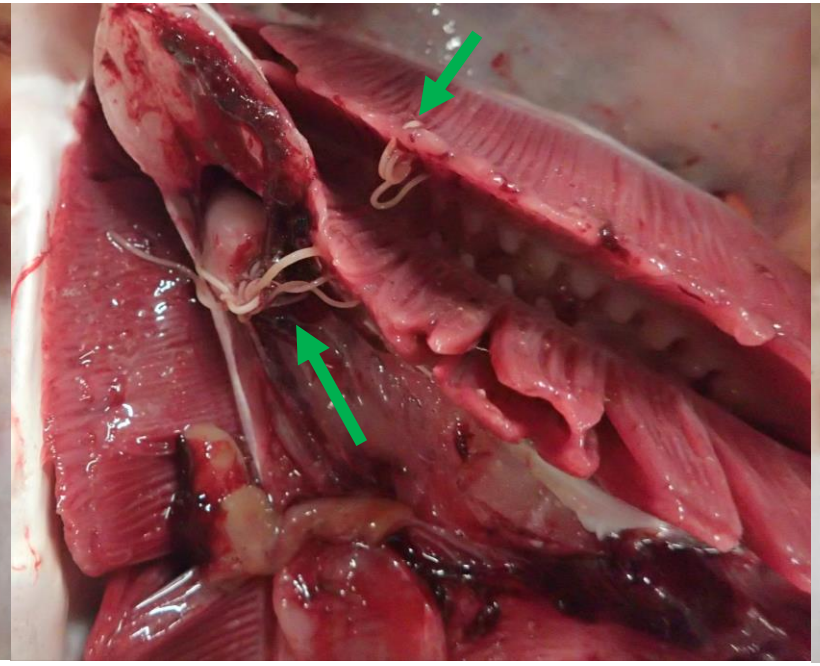
✓ *Hysterothylacium* present in mouth, pharynx, gills and specially stomach & intestines in very high numbers.

Number of cod	Average length	Average weight	Prevalence	Average parasites	Minimum	Maximum
10	90 cm	7 kg	100%	240	10	1092

✓ It appears that cod gets the parasite mostly through predation on infected capelin.



Hysterothylacium in the pharynx



Hysterothylacium in the gill

Hysterothylacium in the stomach contents (i.e. capelin)

Preliminary results

COD (n= 75) West-Finnmark (Hjelmsøybanken)

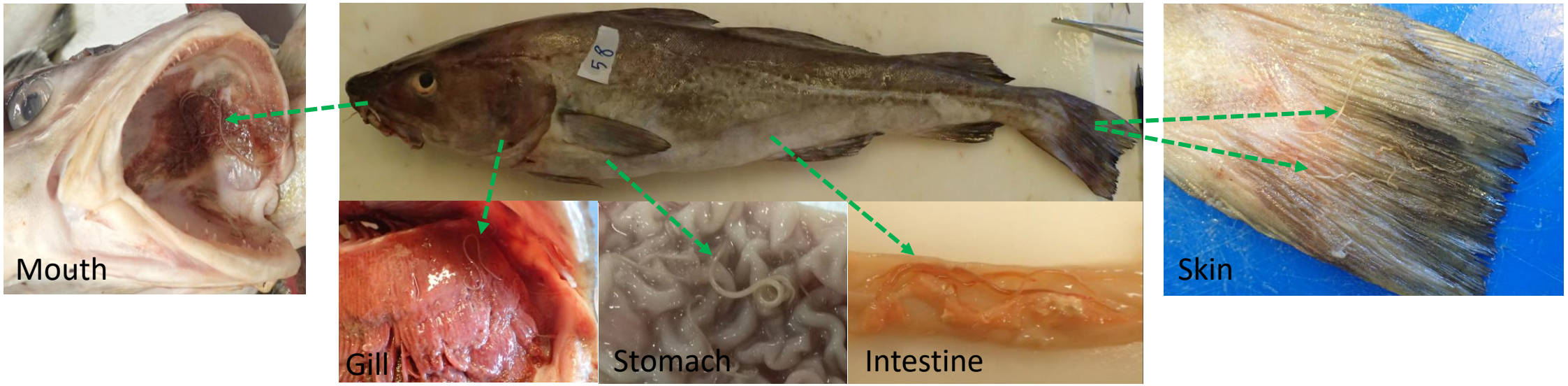


Table: infection levels of adult *Hysterothylacium* in cod

Number of cod	Date	Average length (cm)	Average weight (Kg)	Prevalence	Total number parasites on skin	Total number parasites mouth/gills	Average parasites in viscera	Minimum	Maximum
18 (in ice)	1/2/19	101	10	100%	90	Not available	83	12	298
30 (frozen)	12/3/19	77	4.4	97%	15	60	29	0	148
27 (frozen)	31/5/19	67	2.4	81%	4	4	9	0	110

Preliminary results

Haddock (n= 60) West-Finnmark (Hjelmsøybanken)

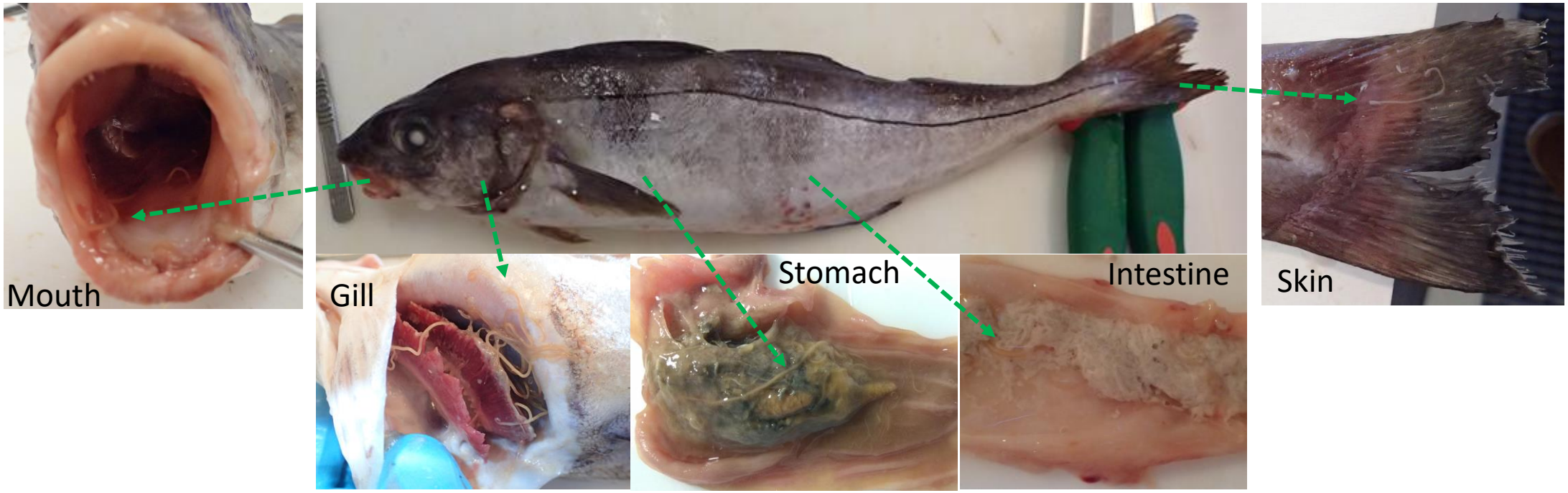


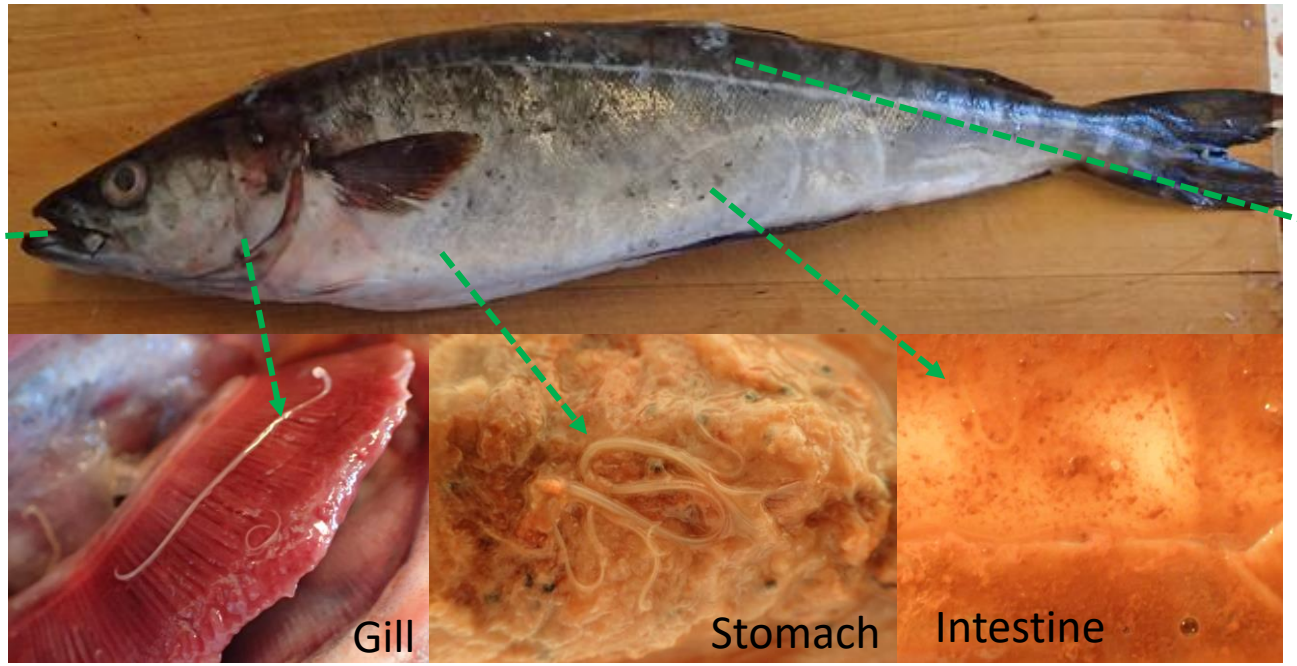
Table: infection levels of adult *Hysterothylacium* in haddock

Number of cod	Date	Average length (cm)	Average weight (Kg)	Prevalence	Total number parasites on skin	Total number parasites mouth/gills	Average parasites in viscera	Minimum	Maximum
30 (frozen)	2/4/19	51	1.3	87%	27	123	16	0	104
30 (frozen)	31/5/19	54	1,4	27%	2	1	1	0	22

Preliminary results

Saithe (n= 60) West-Finnmark (Hjelmsøybanken)

Mouth



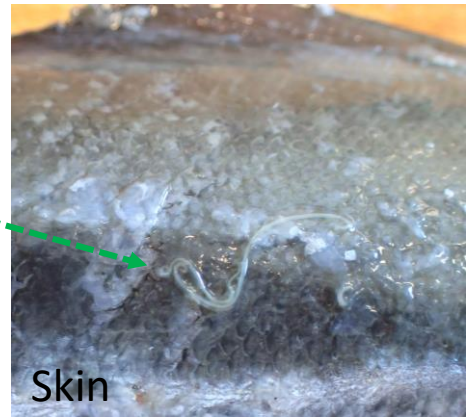
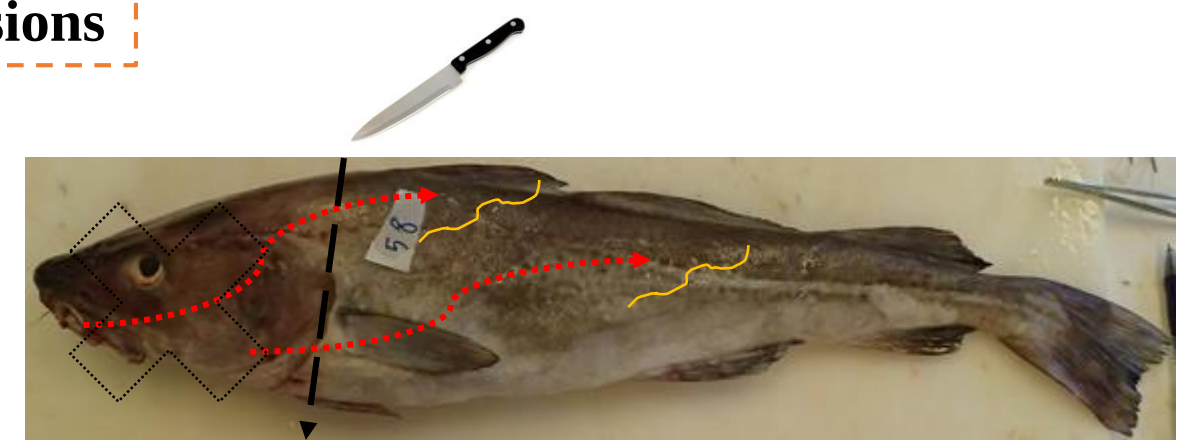


Table: infection levels of adult *Hysterothylacium* in saithe

Number of cod	Date	Average length (cm)	Average weight (Kg)	Prevalence	Total number parasites on skin	Total number parasites mouth/gills	Average parasites in viscera	Minimum	Maximum
30 (frozen)	2/4/19	53	1,6	100%	30	227	46	11	117
30 (frozen)	31/5/19	62	2,2	100%	27	57	12	1	36

Preliminary conclusions



1. Evisceration, cut off head of the fish and rinse carefully fish body would remove *Hysterothylacium* from the whitefish product. This parasite is not present in fillets.

2. The infection levels of *Hysterothylacium* in whitefish apparently vary with fish size and season. Statistical analyses will be carried out.

3. The parasite may survive for long periods in humid and cold conditions (≥ 10 days – 2 months in a fridge), more than enough to remain alive when received by client at destination point.

TUSEN TAKK