

## Working Document 2 (part 2): Reference Document Maturity Stages of Plaice and Sole

---

### Contents

---

Reference Document Maturity Stages of Plaice .....	1
Reference Document Maturity Stages of Sole .....	15

## Reference Document Maturity Stages of Plaice (*Pleuronectes platessa*)

---

### 1 Introduction

---

This document contains the descriptions and reference pictures for the sexual maturity stages of European plaice (*Pleuronectes platessa*). The descriptions as well as the reference pictures were discussed and created by WKMSSPDF 2012.

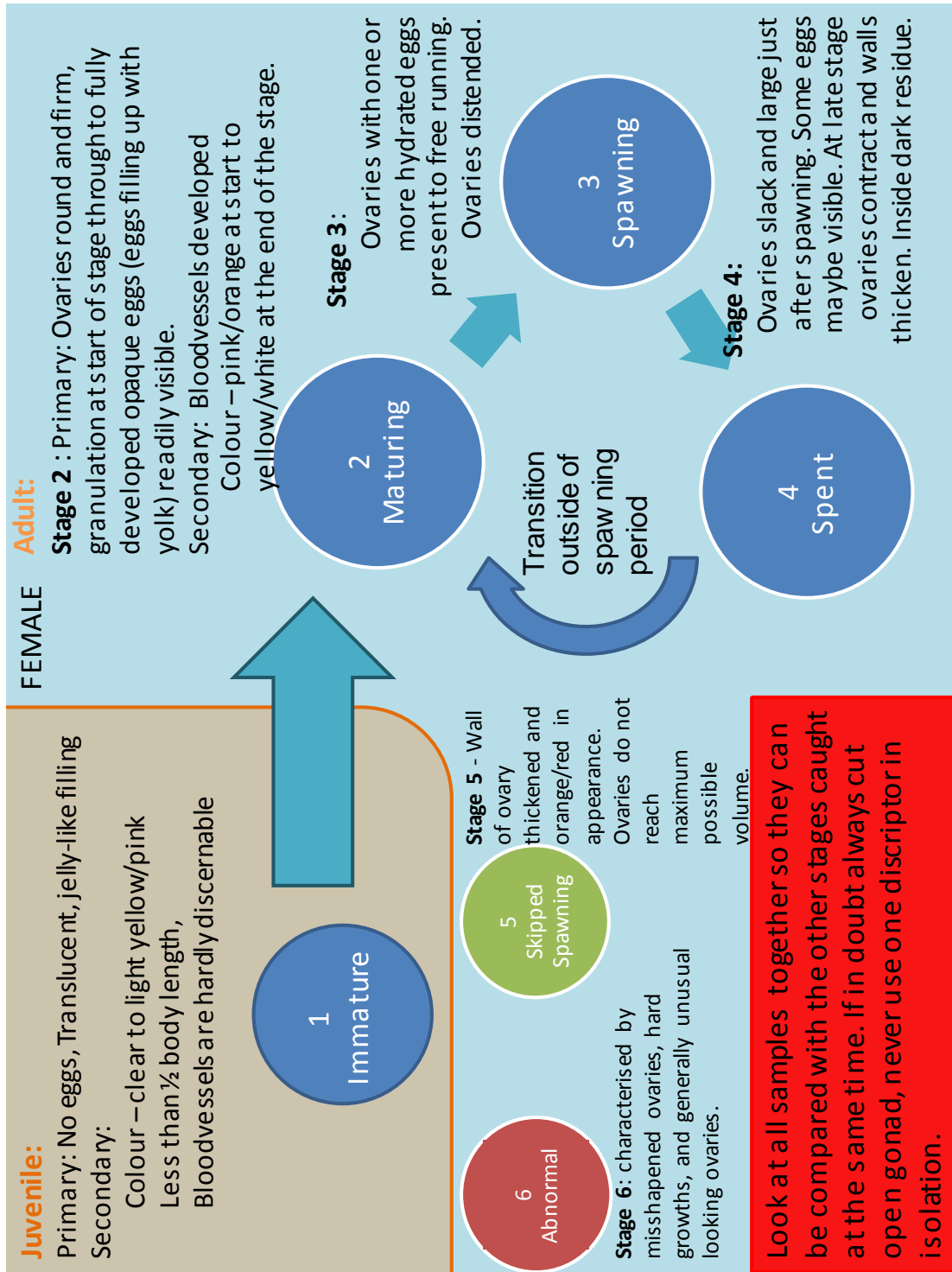
It should be mentioned that reliable macroscopic maturity staging of fish can only be done in the period from two months before the spawning season until the end of spawning. Outside that period, histological samples should be taken to identify the maturity stage. The description of the stages focuses thus primarily on this period.

In general, sexual maturity development in fish is as follows: after the juvenile stage, of which the duration varies by species, fish will mature. In the maturation cycle, the gonads mature (stage 2), the fish will spawn (stage 3) and after that will be spent (stage 4). The next year, this cycle repeats itself.

Incidentally, if the condition of the fish is low, it might decide to skip a spawning season (stage 5), or the gonads of a fish do not develop in a normal way (stage 6).

Chapter 2 describes the sexual maturity stages of female fish, chapter 3 contains maturity scales for males.

## 2 Female



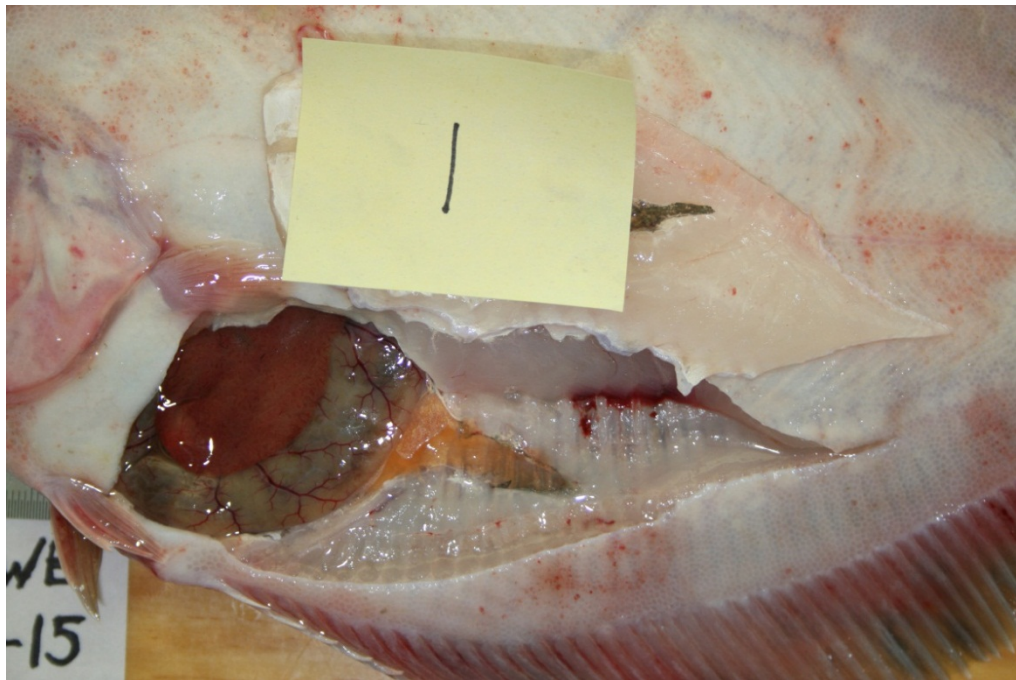
## 2.1 Stage 1 – Juvenile

Primary:

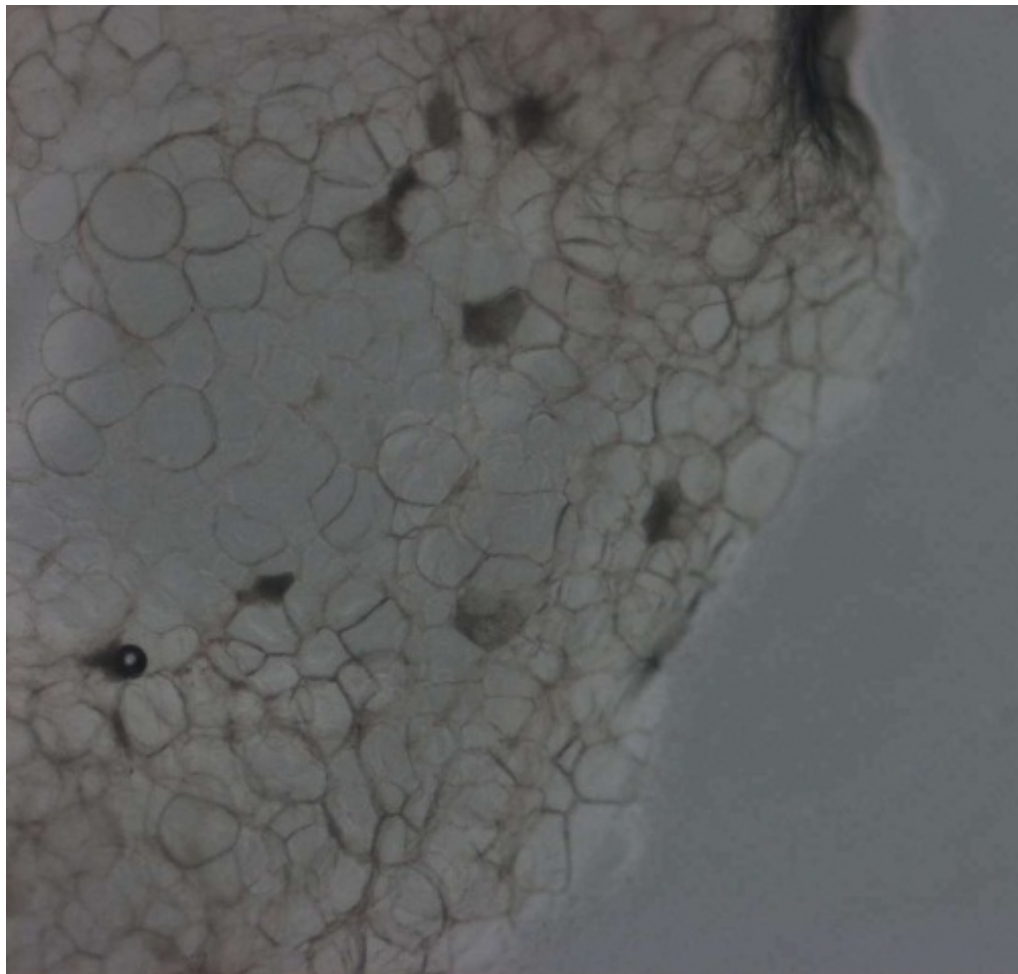
- no eggs
- translucent
- jelly-like filling

Secondary:

- colour – clear to light yellow/pink
- ovary less than  $\frac{1}{2}$  body length
- blood vessels are hardly discernible



picture: SWE\_2009\_ple\_1b.jpg



pictures: from fresh fish during WKMSSPDF 2012, upper macroscopic, lower the smear under the microscope

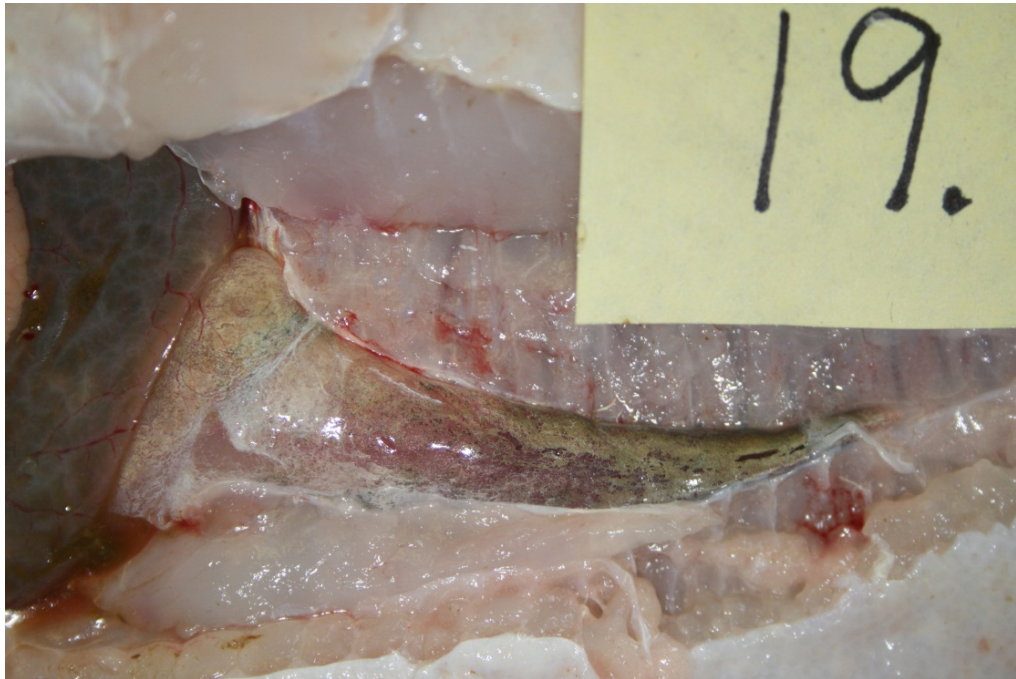
## 2.2 Stage 2 – Maturing

Primary:

- ovary round and firm
- granulation at start of stage through to fully developed opaque eggs (eggs filling up with yolk) readily visible

Secondary:

- blood vessels developed
- colour – pink/orange at start to yellow/white at the end of the stage



picture: SWE\_2009\_ple\_19b.jpg



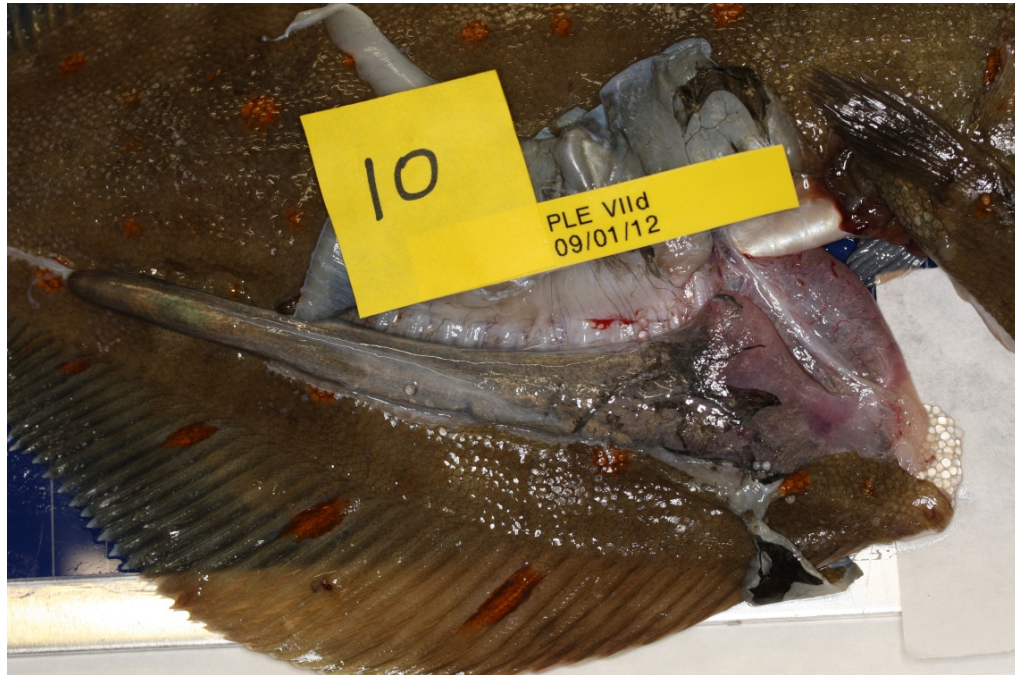


pictures: from fresh fish during WKMSSPDF 2012, upper macroscopic, lower the smear under the microscope

### 2.3 Stage 3 – Spawning

Primary:

- one to many hydrated eggs distinguishable
- occasionally running under light pressure
- ovary distended



pictures: from fresh fish during WKMSSPDF 2012, upper macroscopic, lower the smear under the microscope



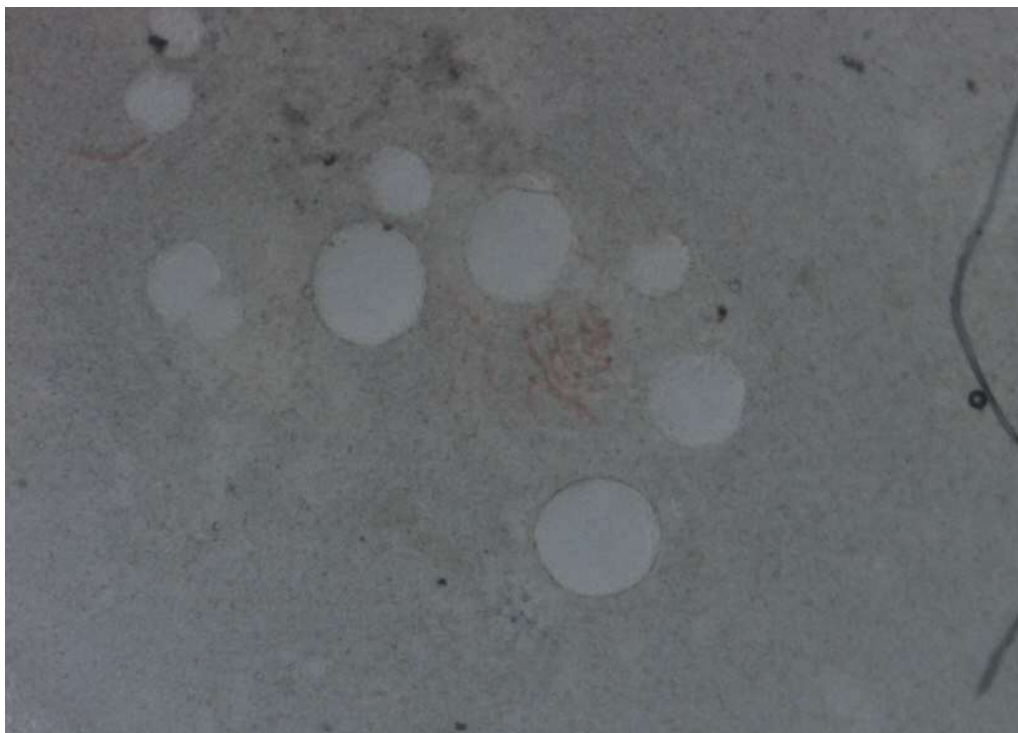
## 2.4 Stage 4 – Spent

Primary:

- ovary slack and large just after spawning
- (hydrated) eggs may be left as residue
- at late stage ovary contract and walls thicken
- dark residue inside the ovary



picture: from fresh fish during WKMSSPDF 2012, early stage 4



pictures: from fresh fish during WKMSSPDF 2012, late stage 4, upper macroscopic, lower the smear under the microscope

## 2.5 Stage 5 – Skipped spawning

Primary:

- wall of ovary thickened
- ovary does not reach maximum possible volume

Secondary:

- colour - orange/red in appearance



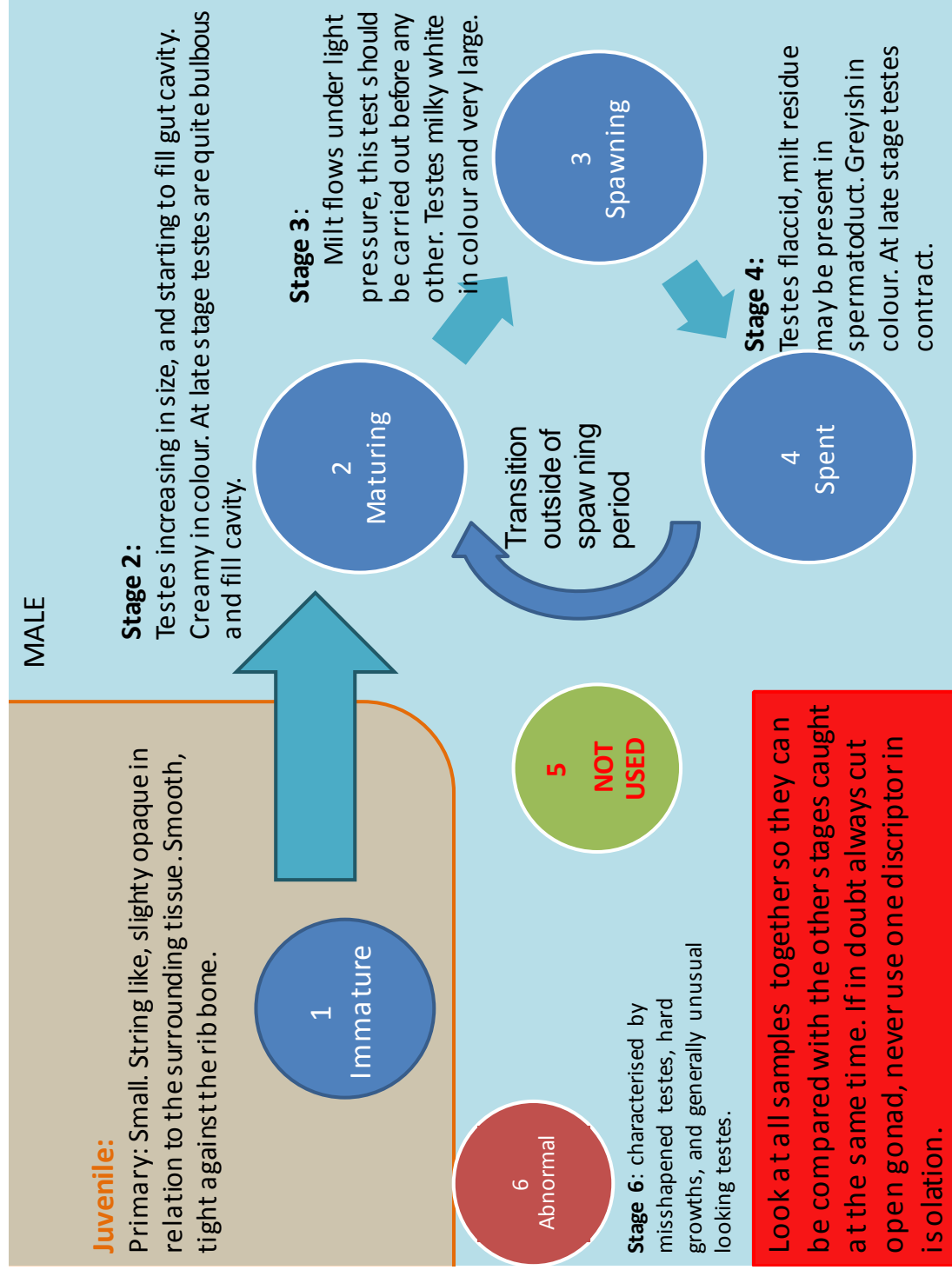
picture: UK2009\_PLE\_18b\_jul\_1.jpg

## 2.6 Stage 6 – Abnormal

This stage is characterised by mis-shaped ovaries, hard growths, and generally unusual looking ovaries. For example: stony gonads, both sexes present in the gonad etc.

No pictures available.

### 3 Male

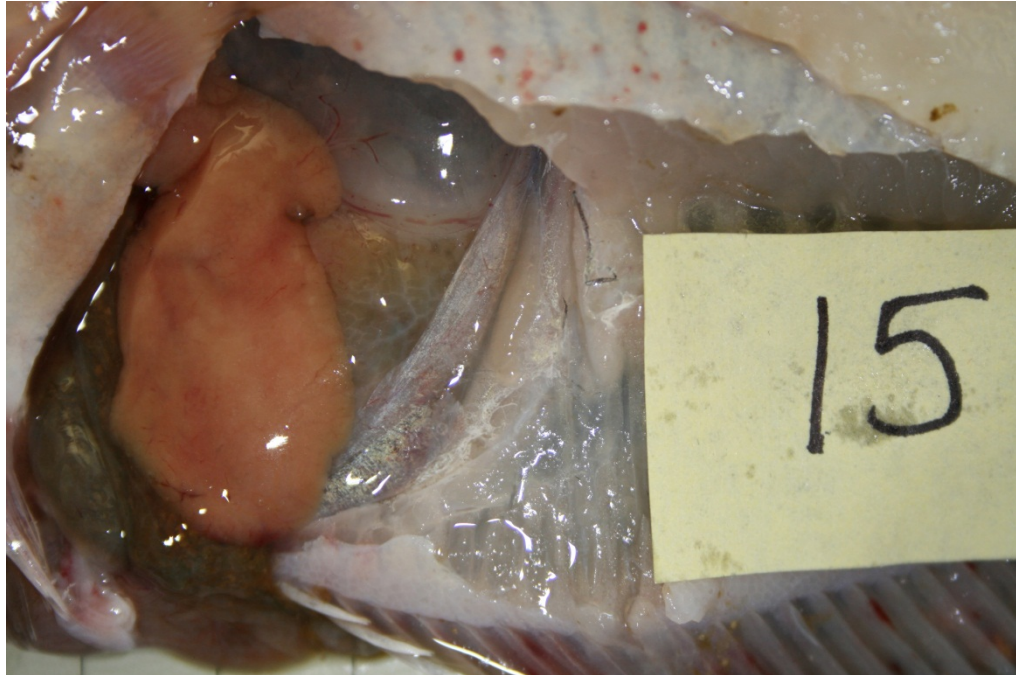




### 3.1 Stage 1 - Juvenile

Primary:

- small
- stringlike
- slightly opaque in relation to the surrounding tissue
- smooth, tight against the anal spine bone



picture: SWE2009\_ple\_15b.jpg

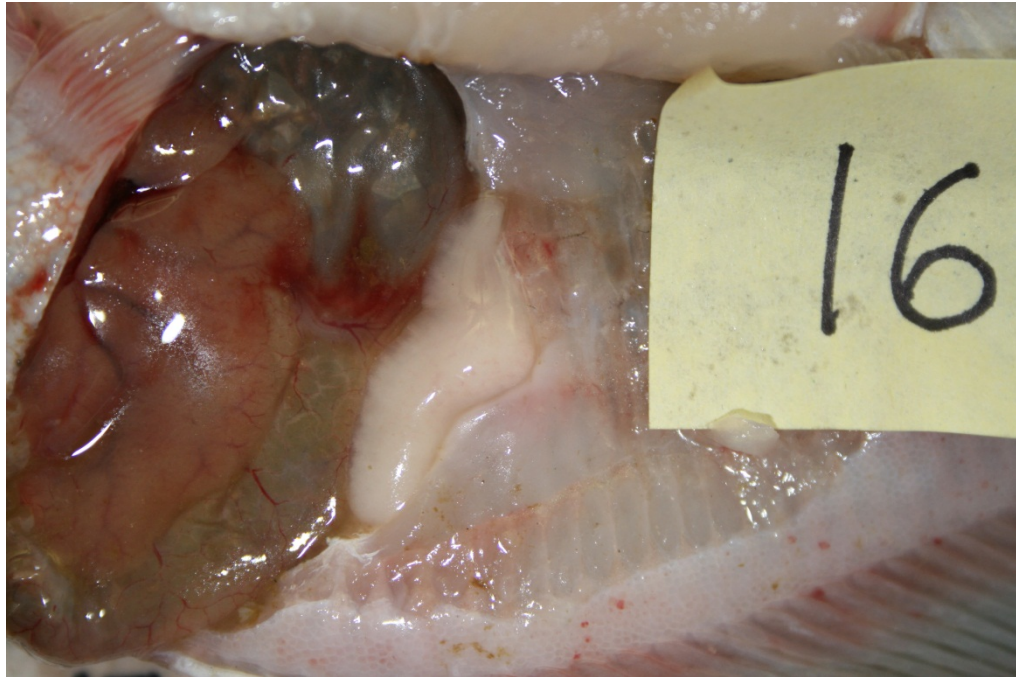
### 3.2 Stage 2 – Maturing

Primary:

- testis increasing in size
- testis starting to fill gut cavity
- at late stage testis quite bulbous and fills cavity

Secondary:

- colour - creamy



picture: SWE2009\_ple\_16b.jpg

### 3.3 Stage 3 – Spawning

Primary:

- milt flows under light pressure, this test should be carried out before any other
- testis milky white in colour
- very large

Secondary:

- colour - milky white



picture: from fresh fish during WKMSSPDF 2012

### 3.4 Stage 4 – Spent

Primary:

- testis flaccid
- milt residue may be present in spermatoduct
- at late stage testis contract

Secondary:

- colour - greyish

No pictures available.

### 3.5 Stage 5 – Skipped spawning

This stage is not used for male fish.

### 3.6 Stage 6 – Abnormal

This stage is characterised by mis-shapened testes, hard growths, and generally unusual looking testes.

No pictures available.

## Reference Document Maturity Stages of Sole (*Solea solea*)

### 1 Introduction

---

This document contains the descriptions and reference pictures for the sexual maturity stages of sole (*Solea solea*). The descriptions as well as the reference pictures were discussed and created by WKMSPDF 2012.

It should be mentioned that reliable macroscopic maturity staging of fish can only be done in the period from two months before the spawning season until the end of spawning. Outside that period, histological samples should be taken to identify the maturity stage. The description of the stages focuses thus primarily on this period.

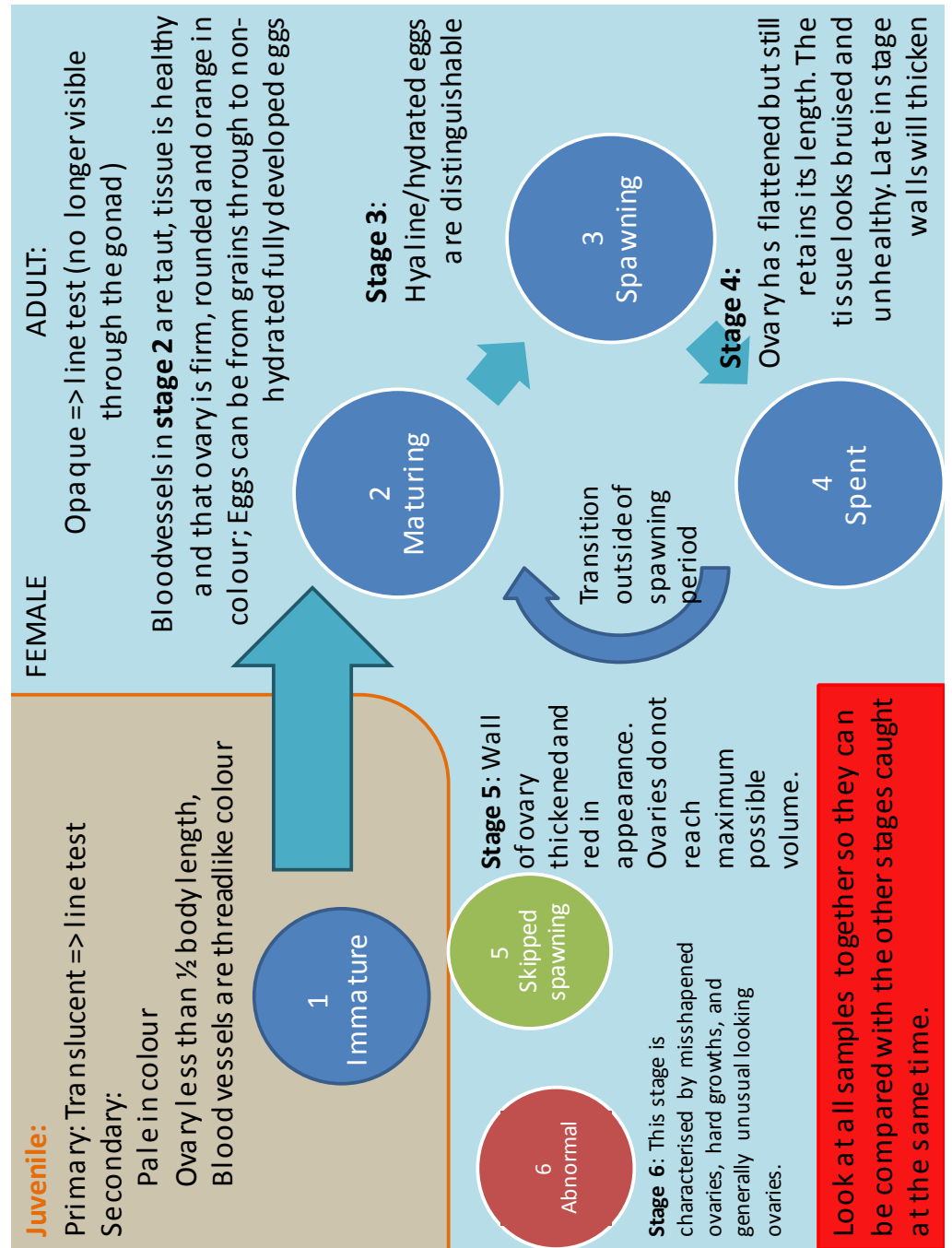
In general, sexual maturity development in fish is as follows: after the juvenile stage, of which the duration varies by species, fish will mature. In the maturation cycle, the gonads mature (stage 2), the fish will spawn (stage 3) and after that will be spent (stage 4). The next year, this cycle repeats itself.

Incidentally, if the condition of the fish is low, it might decide to skip a spawning season (stage 5), or the gonads of a fish do not develop in a normal way (stage 6).

Chapter 2 describes the sexual maturity stages of female fish, chapter 3 contains maturity scales for males.



## 2 Female



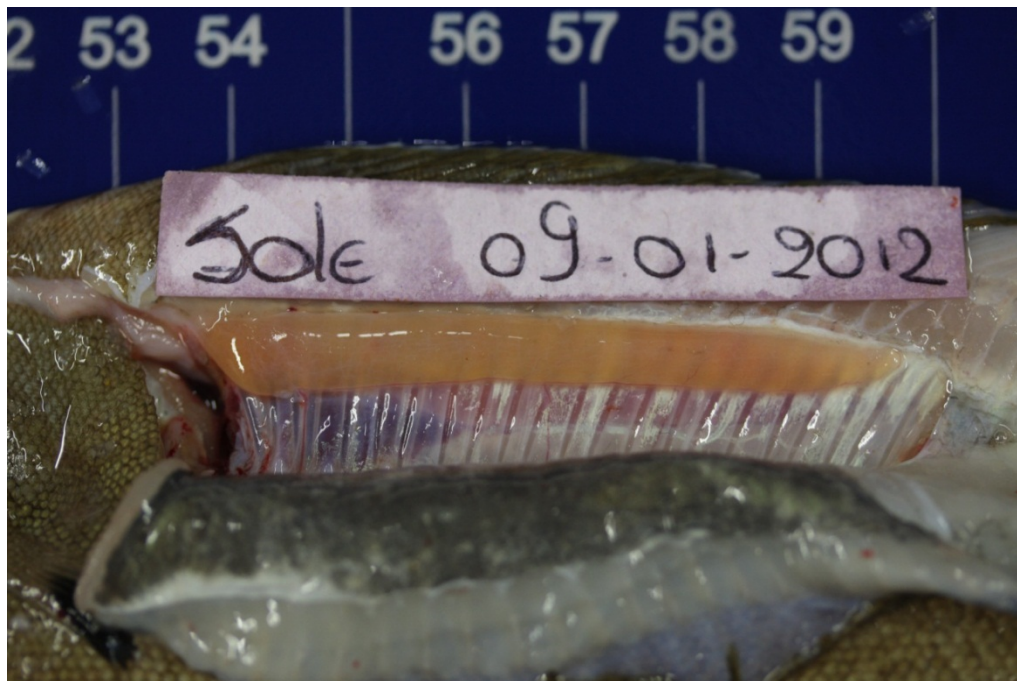
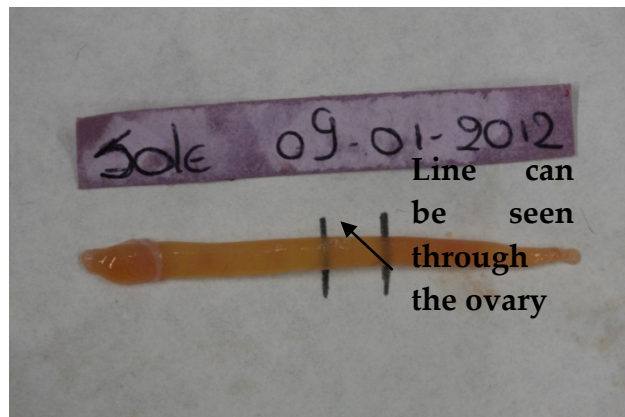
## 2.1 Stage 1 – Juvenile

Primary:

- translucent => line test (picture)
- no eggs

Secondary:

- colour – pale
- ovary less than ½ body length
- blood vessels are threadlike



picture: from fresh fish during WKMSPDF 2012

## 2.2 Stage 2 – Maturing

Primary:

- ovary rounded and firm
- eggs can be from grains through to non-hydrated fully developed eggs
- tissue is healthy

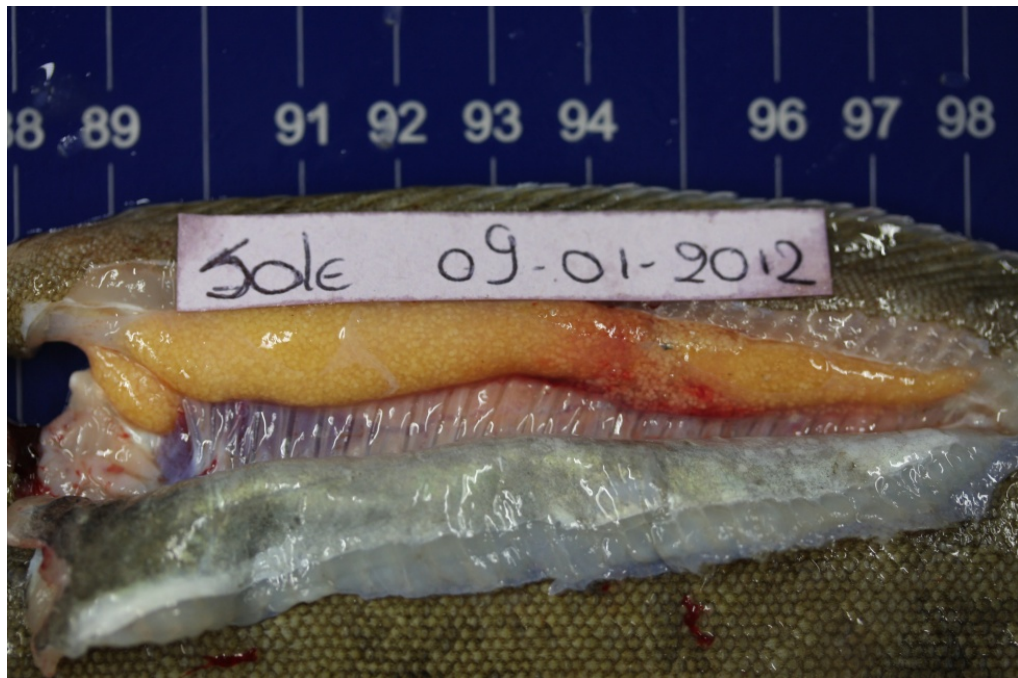
Secondary:

- bloodvessels taut
- colour – orange



pictures: from fresh fish during WKMSSPDF 2012





pictures: from fresh fish during WKMSSPDF 2012, upper ovary inside the body cavity, lower ovary outside body cavity.



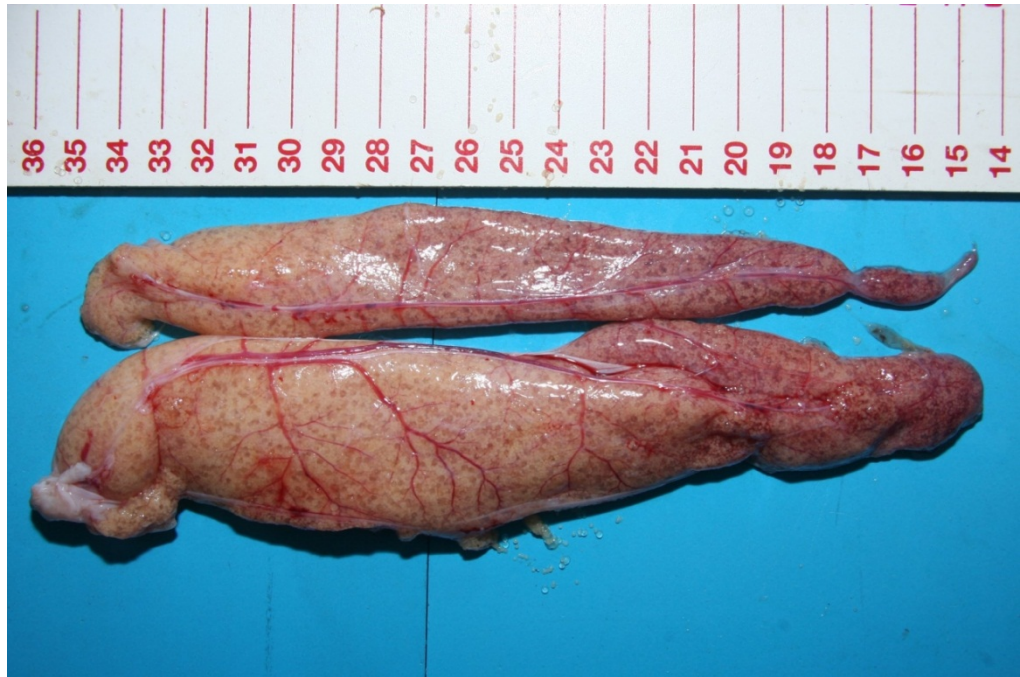
### 2.3 Stage 3 – Spawning

Primary:

- one to many hydrated eggs distinguishable
- occasionally running under light pressure



pictures: ovary in the fish UK2010\_SOL\_002b.jpg (upper), ovary in fish (ventral side) UK2010\_SOL\_005d.jpg (lower)



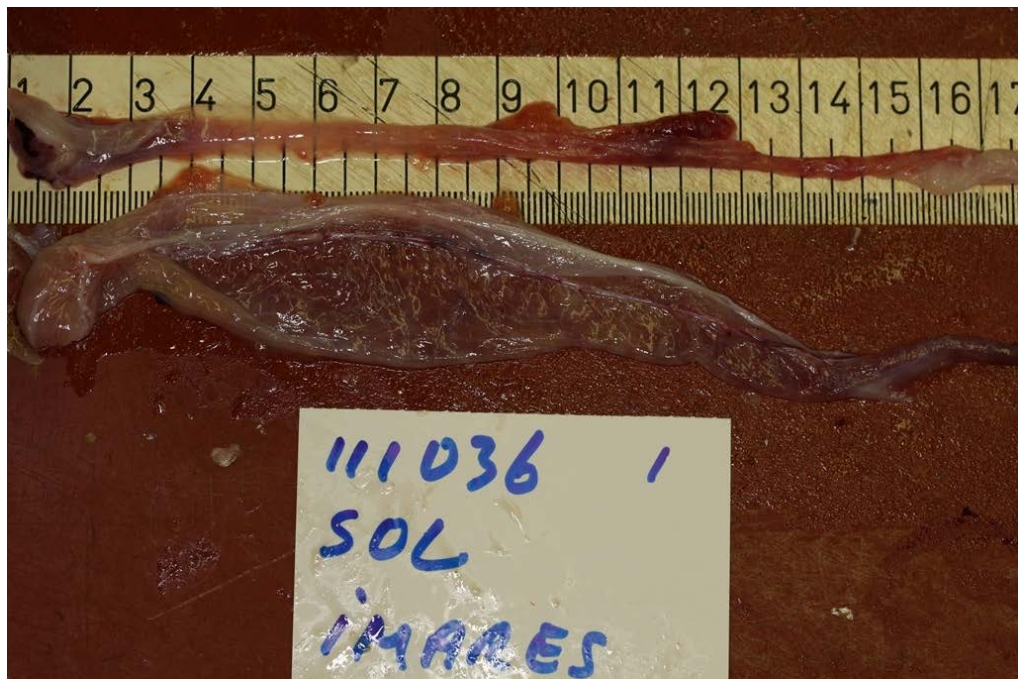
pictures: ovary outside of fish UK2010\_SOL\_002e.jpg (upper), UK2010\_SOL\_005e.jpg (lower)



## 2.4 Stage 4 – Spent

Primary:

- ovary flattened but still retains its length
- tissue looks bruised and unhealthy
- some eggs may be visible
- at late stage ovary contract and walls thicken



pictures: ovary in the fish NED2010\_sol\_111036\_001\_2.jpg (upper) and ovary cut open outside the fish NED2010\_sol\_111036\_001\_6.jpg (lower)



pictures: ovary in the fish NED2010\_sol\_111036\_002\_2.jpg (upper) and ovary cut open outside the fish NED2010\_sol\_111036\_002\_6.jpg (lower)



## 2.5 Stage 5 – Skipped spawning

Primary:

- wall of ovary thickened
- ovary does not reach maximum possible volume

Secondary:

- colour - red in appearance



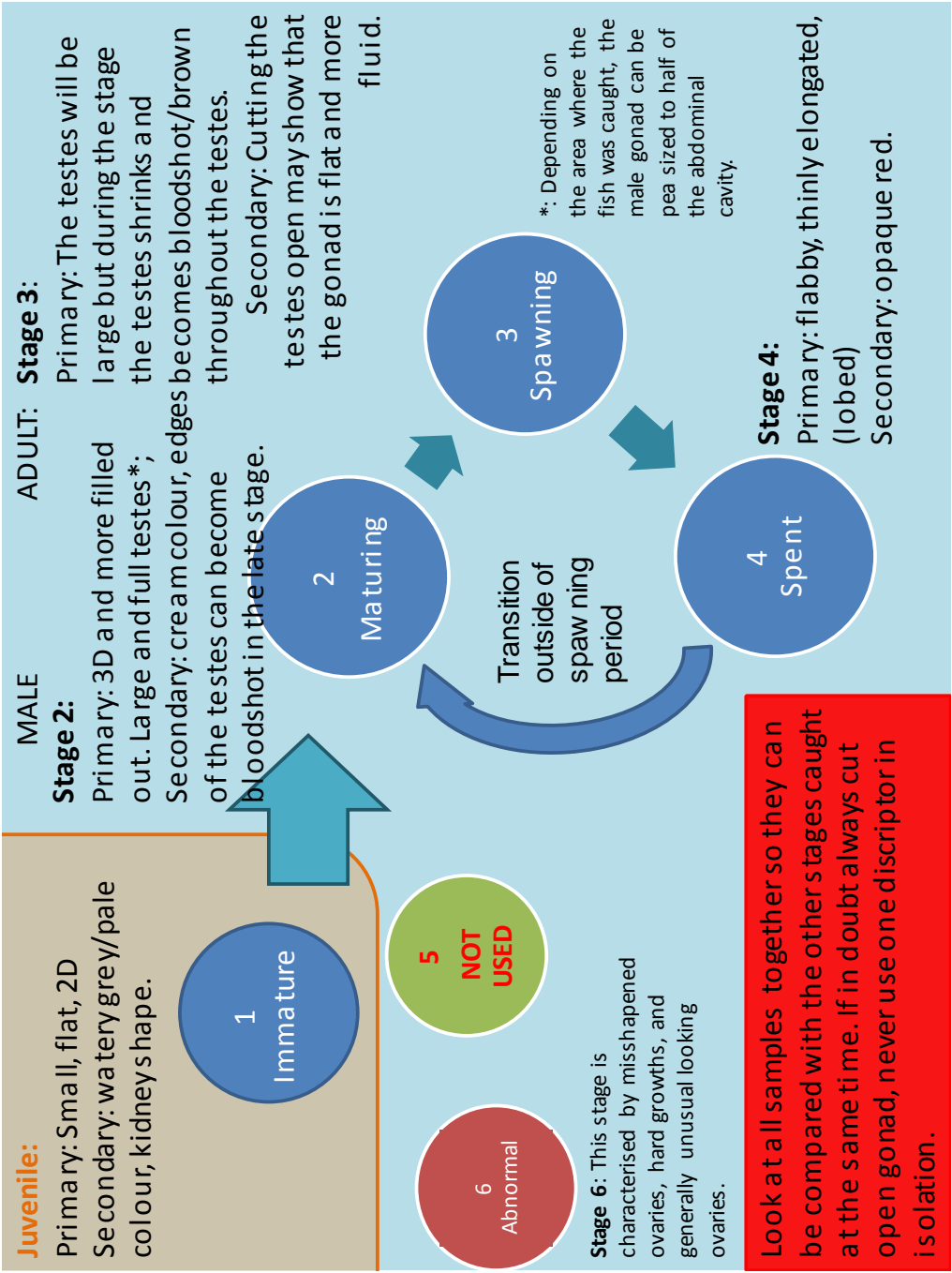
pictures: from fresh fish during WKMSSPDF 2012, upper ovary inside the body cavity, lower ovary outside body cavity.

## **2.6 Stage 6 – Abnormal**

This stage is characterised by mis-shapened ovaries, hard growths, and generally unusual looking ovaries. For example: stony gonads, both sexes present in the gonad etc.

No pictures available.

### 3 Male



### 3.1 Stage 1 – Juvenile

Primary: Small, flat, 2D

Primary:

- testis small
- testis flat, 2-dimensional

Secondary:

- colour watery grey/pale
- kidney shape

No picture available



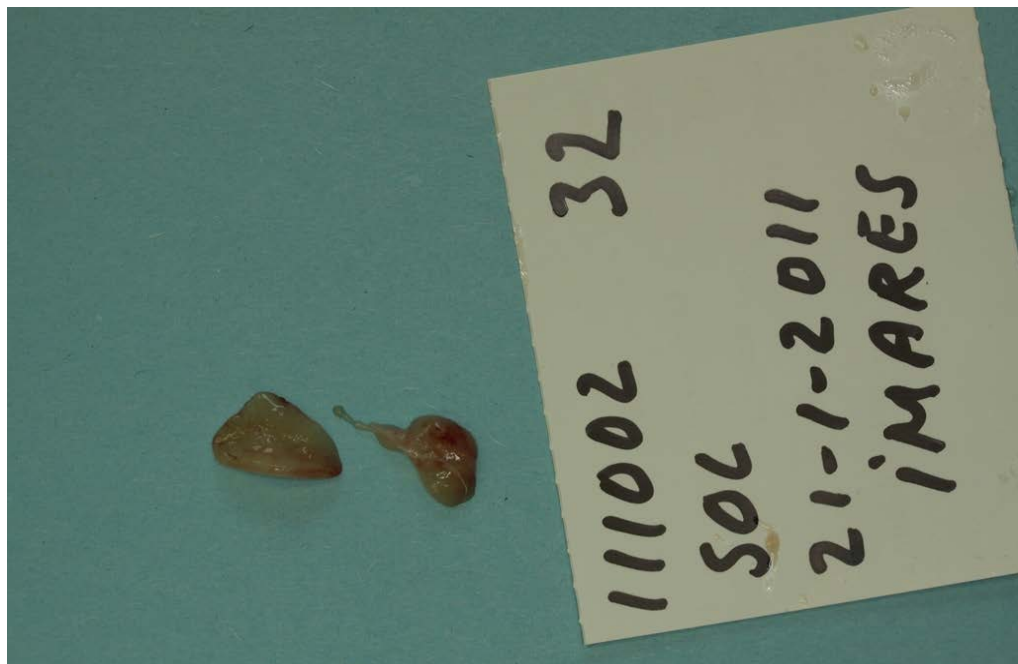
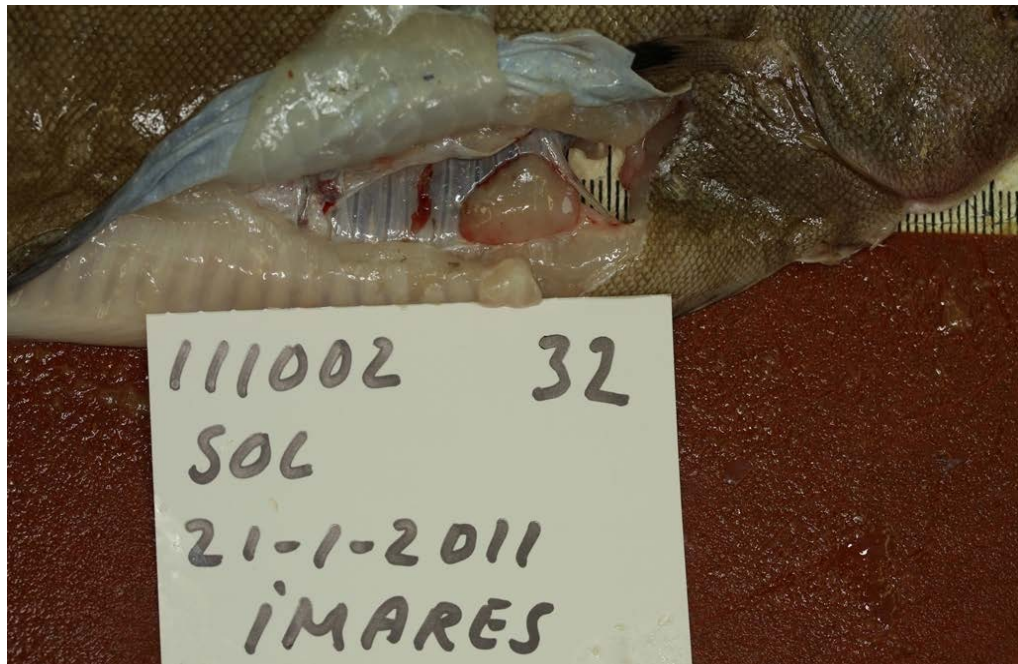
### 3.2 Stage 2 – Maturing

Primary:

- testis large and full
- testis 3-dimensional and more filled out
- testis pea sized to half of the abdominal cavity, depending on the fishing area

Secondary:

- colour - cream
- edges of the testis can become bloodshot in the late stage



pictures: testis in the fish NED2011\_sol\_111002\_002\_2.jpg (upper) and testis outside the fish NED2011\_sol\_111002\_032\_5.jpg (lower)

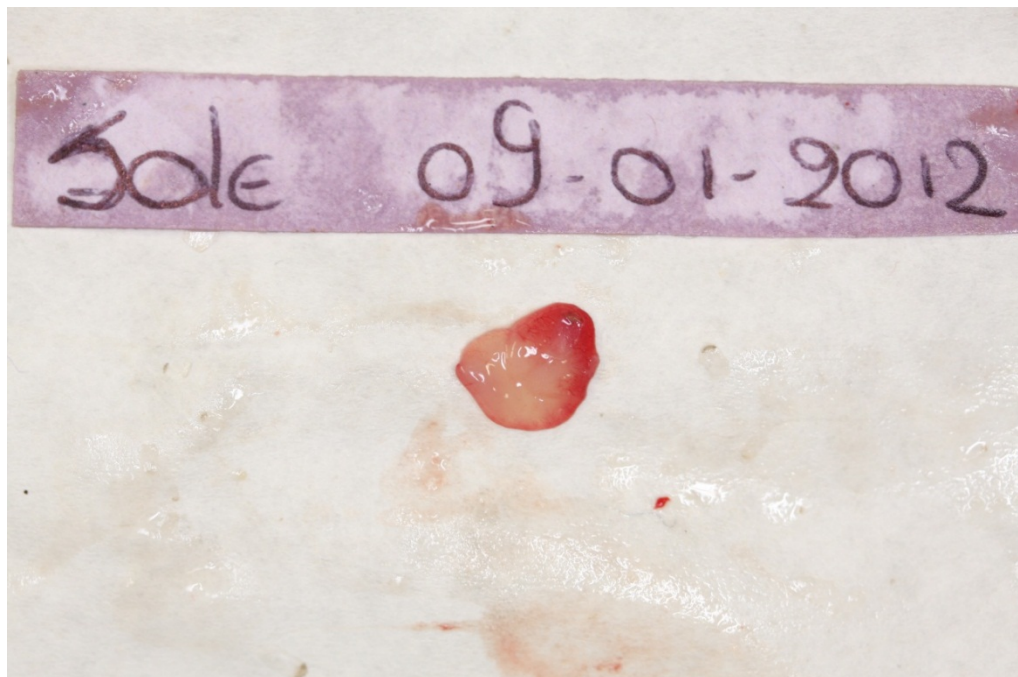
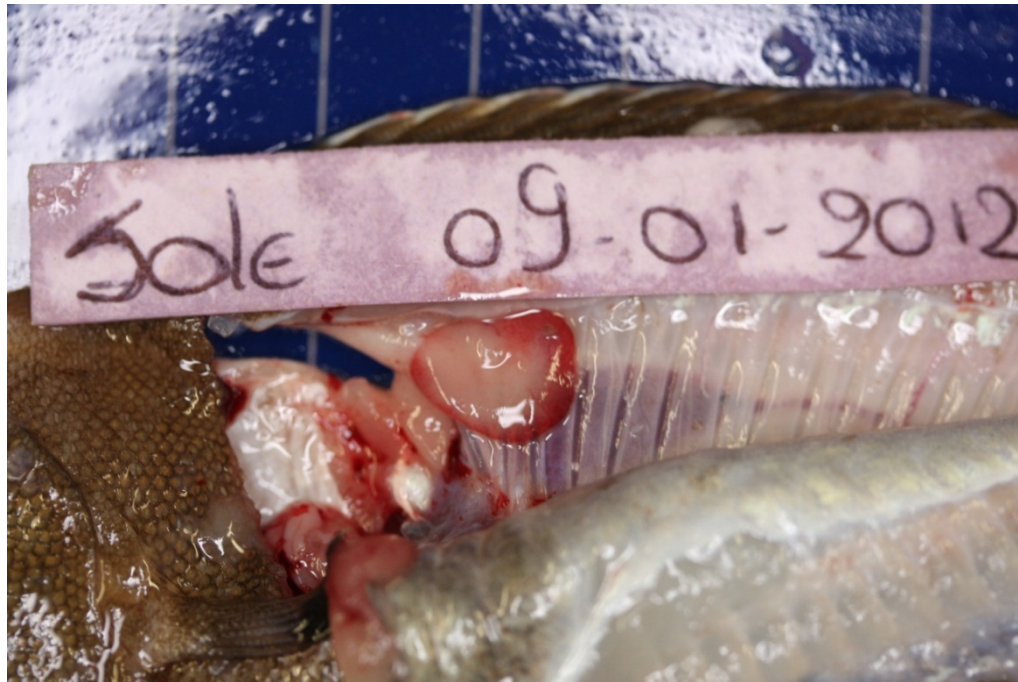
### 3.3 Stage 3 – Spawning

Primary:

- testis large, shrinking during the stage
- cutting testis open may show that the gonad is flat and more fluid

Secondary:

- colour - in a later phase, testis becomes bloodshot/brown throughout



pictures: from fresh fish during WKMSSPDF 2012, upper testis inside the body cavity, lower testis outside body cavity.



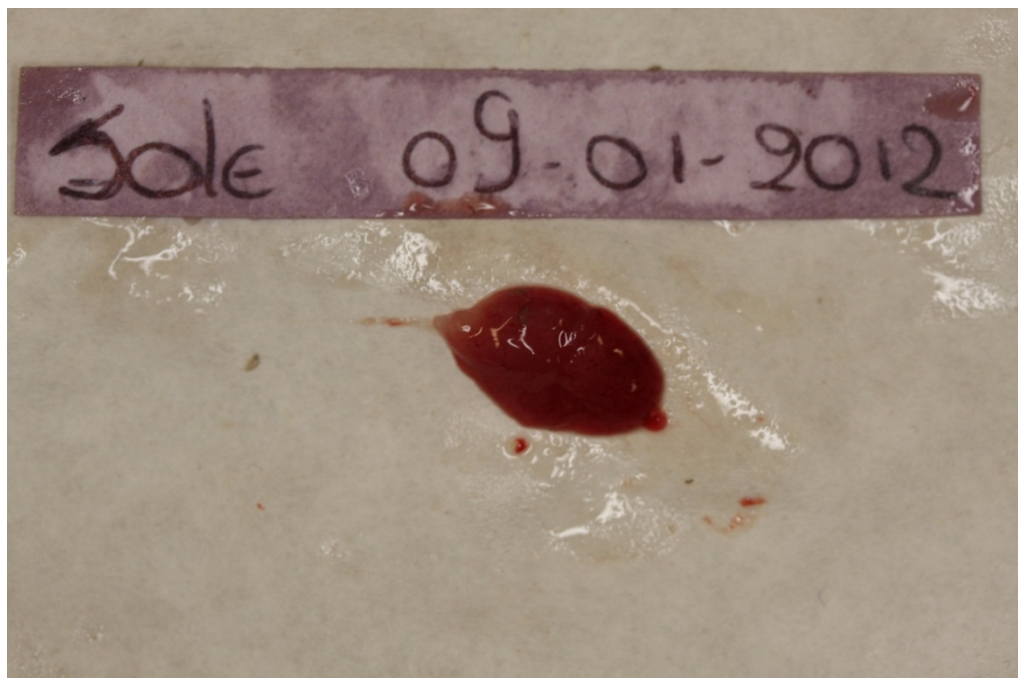
### 3.4 Stage 4 – Spent

Primary:

- testis flabby (lobed)
- testis thinly elongated

Secondary:

- colour - opaque and red



pictures: from fresh fish during WKMSSPDF 2012, upper testis inside the body cavity, lower testis outside body cavity.

### **3.5 Stage 5 – Skipped spawning**

This stage is not used for male fish.

### **3.6 Stage 6 – Abnormal**

This stage is characterised by mis-shapened testes, hard growths, and generally unusual looking testes.

No pictures available.