Our engagement for sustainable management of ray and skate stocks in the English Channel and the North Sea

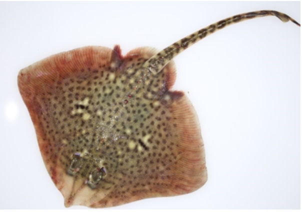
SUMARiS NEWSLETTER 2 - July 2018

Why the SUMARiS project? Interview with a scientist from ILVO

"ILVO (Flanders Research Institute for Agriculture, Fisheries and Food) stands for multidisciplinary, independent research and specialized services in the fields of agriculture, fisheries and food in Flanders (Belgium).

As an internationally recognized scientific institute, ILVO is an important player in cross-border initiatives and collaborations related to fisheries science and management.

After the introduction of the Landing Obligation, ILVO has jump started survival research to investigate whether high survival probability of specific species could entitle the fishing sector to seek exemptions to this obligation.



*Our researchers applied and developed further a vitality assessment method (**Reflex Action Mortality Predictor method, or RAMP in short**) for flatfish, such as plaice and sole, the most important species for Belgian commercial fishers in terms of biomass and revenue. We were therefore pleased to bring our scientific expertise in quantifying survival rates for discarded rays to the SUMARiS project. While some earlier studies have indicated that rays may be a robust and resilient species likely to survive being caught-and-released at sea, there are still important knowledge gaps.*

By leading the work on survival, our objective is to quantify on-board vitality and post-capture survival rate for different ray species (mainly thornback ray but also spotted, undulate and blond rays) captured with both active and passive fishing gears in the North Sea and the English Channel.

Thanks to the combined efforts of the SUMARiS partners, we will be able to increase our spatial and temporal knowledge of the species in the region and be able to quantify their survival rate in relation to the fishing gears used.

*This will result in a more holistic, comprehensive study on ray discard survival, which, in turn, will lead to a more effective fishery management strategy in the **INTERREG 2 Seas** area."*

Noémi Van Bogaert, Research associate, ILVO, Ostend, Belgium

What is going on in the SUMARiS project?
Focus on the RAMP Method

Developing the Reflex Action Mortality Predictor method to correlate ray's vitality, reflex impairment and injury with its survival probability

Obtaining a representative estimate of the survival probability of a discarded species and the entire fishery is very challenging and would ideally be based on a sufficiently large sample of tagged-and-discarded individuals. But this is rarely achievable due to the considerable tagging effort, great costs and tight timelines, so other cheaper and less labour-intensive methods may be used for estimating the survival probability of discarded species. Combining on-board vitality assessments with monitoring observations of specimens held in captivity is a widely used combination of methods to achieve this.

Our work in the framework of the SUMARiS project will be carried out **on board and on land**.

On-board of a vessel it will be divided into four main steps: **sorting, sampling, scoring and monitoring** (Figure 1).

During the sorting of the catch, when crew members pick individuals worthy to land (Step 1), the SUMARiS appointed observer will evaluate the size of the catch of rays to decide on a sampling strategy (Step 2). If the catch contains many rays, the observer will randomly sub-sample the catch and pick a number of rays and put them into baskets during the beginning, mid and end phase of catch sorting.

If the number of rays in the catch is small, the rays will be individually selected and immediately scored.

For the vitality, reflex impairment and injury scoring (Step 3), the observer will score each individual ray for **vitality, four reflex responses and six injuries**. Important biological data, such as size and sex, will be also recorded in this step. After scoring, a subset of the rays will be followed-up on-board in separate monitoring boxes for their post-capture survival. The monitoring units will be checked for environmental parameters and for mortality at regular intervals.

After the sea trip, the same rays will be further **monitored in larger tanks** at Nausicaá and ILVO for a minimum period of three weeks under conditions which ideally match their native habitat.

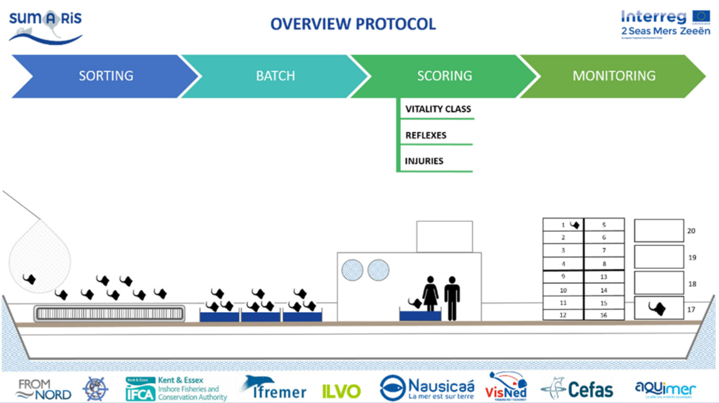
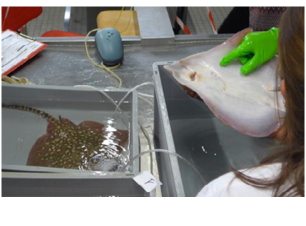


Figure 1 : Overview of the steps undertaken to sort, sample, score and monitor commercially caught-and-discarded rays for their vitality, reflex impairment, injury and survival probability - (© ILVO)



For scoring (Step 3), the **RAMP method** will be used. This protocol is based on previous work done by the UK (CEFAS), France (IFREMER) and the Netherlands (Wageningen Marine Research).

The RAMP method involves scoring for the presence or absence of reflexes and scoring the severity of different injury types to generate an index, which is then correlated with the observed survival rate of the same individual.

To establish which reflexes may indicate whether an animal has been stressed and/or injured, we first studied acclimatized rays to make sure that the four reflexes (**"Tail grab"**, **"Startle touch"**, **"Spiracles"** and **"Body flex"**) we had chosen were easily recognizable, unambiguous and consistently present among the relatively unstressed rays.

After the reflex test, each ray will then be scored for the severity of six types of injury: **bleeding to the head, body and tail, open wounds and fin damage**. The surface of the bleeding injury (i.e. the discoloration percentage) will be scored along a categorical scale from 0 to 3.

We will be looking for a **strong relationship** between the combination of these different scores and survival observations, and plan to be able to attribute these outcomes to key technical, biological and environmental parameters which will be recorded during each fishing operation.

Latest events

Partners of the SUMARiS project on a guided tour and in a training session at the Flemish fish auction in Zeebrugge, **16th March 2018.**

Training the SUMARiS appointed sea observers to use the RAMP method by ILVO scientists, **14th May 2018.**

Did you know? Rays and Skates - General Characteristics

Anatomy

Rays and skates have similar characteristics: a flattened body shape, eyes and spiracles on the top of the head and enlarged pectoral fins attached to their head. Their buccal cavity is on the underside of their body and so is the opening of their 5 pairs of gills.

Rays and skates are rajiforme species and just like sharks they belong to the order of **Elasmobranchii.** Their skeleton is made out of cartilage which is more robust and lighter than bone. This lightness helps them to propel themselves and catch their prey quickly. Their skin is covered with many tiny teeth called dermal denticles.
They point in the same direction which allows for a hydrodynamic glide efficiency in swimming. Some species have thorns on different parts of the body: tail, head, back... They use them to defend themselves against predators.

It is easy to tell the difference between a male and a female ray/skate because male individuals have a pair of claspers along the tail which they use for reproduction.

Reproduction

The reproductive strategy of rays and skates differs depending on the species, but the fertilization is internal for all of them. In terms of incubation, they can be viviparous or oviparous.

Rays (e.g. Torpedo ray and Manta ray) are viviparous because their young ones develop inside the body of the mother and are born alive. Inside, the developing embryos receive all elements necessary for their growth: oxygen, nutriments...

Most skates are oviparous, they lay eggs in tough eggcases. The young develop and hatch in an egg outside the maternal body. In both cases the young hatch or are born as fully developed miniatures of their parents and they are capable of feeding themselves and avoiding predators. The species studied in the SUMARiS are oviparous: Thornback ray, Undulate ray, Cuckoo ray...

Ecology

Rays and skates in the North Sea and the Channel are **benthonic fish**, which means they live on the bottom of the sea. They eat mostly shrimps, crabs, oysters, clams and other invertebrates. They are carnivorous species and they burry themselves in sand to catch their prey by surprise.

They swim by flapping their pectoral fins, just like birds flap their wings for flying.

Our activities in 2018

ADVANCING FISHERY KNOWLEDGE

June 2018 – July 2019

In the coming months, ILVO and Nausicaá will accommodate **juvenile and adult Thornback rays collected** on sea trips. The rays will be monitored in large tanks for a minimum period of three weeks in conditions that match their native habitat.

December 2018

Ifremer
THALASSA

On the last scientific expedition of the «N/O Thalassa» scientific boat in the Channel and the North Sea, IFREMER scientists fished some rays and skates.

They were able to perform a **sampling of vertebrae** on them. In the coming months IFREMER and ILVO will estimate the age of the rays. But before that, the teams of scientists will have to work together **to create a common protocol for ray ageing** using the vertebrae like calcified structures of rays and skates.
Some protocol steps like cleaning, processing and interpreting vertebra section are being discussed. IFREMER, ILVO and CEFAS will present this protocol to working groups at the International Council for the Exploration of the Sea (ICES).

BUILDING A DATABASE

September 2018

FROM Nord and IFREMER compile the data on ray and skate fisheries (landing/catch/effort statistics, spatial distribution, life traits history).. The database will include **data of the sea trips and of the survival test results based on the RAMP method** and will be launched in September 2018.

December 2018

IFREMER has started to work on the **atlas of the distribution of rays in the Channel and Southern North Sea.**

The atlas is due in December 2018.

TESTING A SURVIVAL RATE – SEA TRIPS

June 2018 – October 2019

Sea trips on board of commercial fishing vessels will take place from June 2018 to October 2019 according to countries. For testing the protocol, the first sea trip on a French boat with a trammel net will be organised in July.

The aim of sea trips is to collect data about rays and skates captured with various fishing gears: **bottom trawler, ottertrawler, gill nets and trammel nets**

TRAININGS ON HANDLING RAYS AND SKATES

From September 2018 onwards

Rederscentrale and ILVO will develop a common code of conduct for optimal operations and handling of skates and rays on board and in fish auctions.

December 2018

Rederscentrale and ILVO will develop a **guide for fishermen** to help them to identify and handle the catches of rays and skates in a correct manner.

MANAGING STOCKS TOGETHER IN A SUSTAINABLE WAY

July 2018

FROM Nord, Rederscentrale and KEIFCA will write a **local baseline paper.**

It will be a compilation of information about different subjects related to the biology of rays and skates, fishing status and local management measures. It will help to build a **context-based common vision and trust among partners.**

OTHER EVENTS

September 2018

At the end of September, some studies led within the framework of the project (sustainable management of rays and skates) will **be presented during the next ICES annual Science Conference 2018** in Hamburg, Germany. IFREMER will put forward the atlas of the distribution of rays in the Channel and Southern North Sea whereas ILVO will present the vitality assessment protocol for rays.

Connect with us

The project SUMARiS is online !

- http://www.fromnord.fr/le-from-nord/nos-projets-en-cours-de-realisation
- https://www.kentandessex-ifca.gov.uk/im-interested-in/research/rays-and-skates/
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- http://www.rederscentrale.be/index.php?page=activiteiten&subcategorie=92&lang=ned
- https://www.visned.nl/aanlandplicht/259-sumaris-project-wellicht-bijdrage-aan-chokespeciesdiscussie

SUMARiS

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