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P. [04 - 05] CROSS ITW:
MANAGING KELP STOCKS

P. [06] THE ALGAE CLUSTER
COORDINATING THE INDUSTRY

P. [07] NEW RULES
FOR ORGANIC LABELLING

SEAWEED



A MULTI-FACETED RESOURCE

Jean-Baptiste Wallaert, President of the Algae and marine plants association.

Although seaweed habitats may be highly localised, they are responsible for bringing together a range of stakeholders. Jean-Baptiste Wallaert, President of the Algae and marine plants association (CSAVM), believes the best way to optimise seaweed use is for the different interest groups on the Atlantic coast to cooperate. "90% of French seaweed comes from Brittany and our 2,700km of coastline", notes **Jean-Baptiste Wallaert**. In fact, the source can be further pinpointed to the area between Saint-Malo and South Finistère. "We are fortunate in Brittany. The stakeholders involved in this sector form a sort of ecosystem of their own. They understand this natural resource, monitor its quality and harvest and use it for a wide variety of applications."

The President of the CSAVM divides these stakeholders into three strands. First there is the regulatory strand, represented in particular by the **Regional Committee for Sea Fishing and Marine Aquaculture (CRPMEM)**, which ensures rules on harvesting are respected and biomass is well managed. Secondly, the scientific and academic strand has the authority to issue advice and develop regulation. The key player here is **Ifremer**, but the **Roscoff marine station**, the **University of Brest (UBO)** and the **Catholic University of the West (UCO)** also play important roles. Finally, the business strand contributes to the historic and scientific knowledge, understands the demands of the market and knows how to add value to seaweed products and by-products.

The **Algae Technology and Innovation Centre (CEVA)** makes a twin contribution: to both the industrial and agricultural applications of seaweed. Two other entities are also helping to shape the industry – the **Algae Working Group of the Regional Committee** and the **Algae Cluster** set up in 2018 by the **Pays de Brest** (see page 6 to find out more).

A CHANCE FOR BRITTANY TO PLAY A LEADING ROLE

Of approximately 700 edible seaweed species recorded, only around forty are authorised to be sold for consumption, be it for food, health (medicines and cosmetics) or agriculture where they are mainly used as fertilisers. **Jean-Baptiste Wallaert** explains:

"Supply management is a key challenge and the only way to ensure the resource is fully used is through cooperation. It is important to foster relationships between suppliers and buyers and to enhance the quality of products through labelling or by finding better ways to add value.

We remain highly dependent on imports (up to 130,000 tonnes compared with local production of around 80,000 fresh weight tonnes). Of course, some of this volume is accounted for by algae that don't grow here and seasonality is another contributing factor. However, we could begin to redress the balance by testing new species and by looking more closely at what happens in Spain and

Portugal, for example. Brittany, with its natural resources, scientific community and network of entrepreneurs, has considerable clout and could definitely play a leading role in this rapidly growing market. This would also help to address the growing issues around self-sufficiency in food."

INFO + www.chambre-syndicale-algues.org



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KEY FIGURES FROM THE SEAWEED SECTOR*

* Source: report by ADEUPa / Pays de Brest Algae Cluster

76,333

76,333 TONNES OF SEAWEED PRODUCED IN FRANCE IN 2018

55,000

55,000 TONNES OF SEAWEED COMES FROM PAYS DE BREST

90%

90% OF FRANCE'S SEAWEED COMES FROM BRITTANY

2,000

2,000 JOBS IN BRITTANY'S SEAWEED PROCESSING INDUSTRY

N°. 1

NO. 1 PORT FOR LANDING SEAWEED IN FRANCE AT LANILDUT: 54% OF SEAWEED LANDED IN FRANCE 26-VESSEL FLEET

TINCTURA

TINCTURA IS AN UP-AND-COMING COMPANY IN THE RAPIDLY GROWING MARKET FOR ALGAE-BASED FOOD SUPPLEMENTS. IT SPECIALISES PRIMARILY IN SPIRULINA. FOLLOWING TWO YEARS OF RESEARCH AND DEVELOPMENT, CO-FOUNDER FLORENTIN DONOT AND CEO ÉRIC BARREAU ESTABLISHED AN ORIGINAL PROCESS FOR EXTRACTING THE MAIN MOLECULES OF INTEREST WITH ANTIOXIDANT AND IMMUNOSTIMULANT PROPERTIES, INCLUDING PHYCOCYANINE.

Tinctura adapts its products to suit its customers: mainly laboratories or brands who sell products in health-food shops, pharmacies and similar outlets. **Maxime Pasquier**, head of sales and marketing for the company, explains that Tinctura only makes white-label products.

Tinctura produces 100% natural extracts, with no preservatives. Its workshop is based in Ploudaniel, Finistère, and includes a clean room which can handle aseptic processing into drinkable ampoules. All the raw materials used are grown in France, in accordance with very stringent microbiological criteria.

After just one year in business, the company is set to increase its workforce to six by the end of 2021. **Tinctura** has also announced that it will work with Breton producers to develop new formulas, this time based on marine plants.



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INFO + www.tinctura.fr/en

AGRIMER AT THE CUTTING EDGE OF MOLECULAR COSMETICS

AGRIMER, WITH ITS HEADQUARTERS IN PLOUGUERNEAU, HAS PROVED ITSELF A MAJOR PLAYER IN PROCESSING AND ADDING VALUE TO BRETON SEAWEED. DRAWING ON KNOWLEDGE FROM LOCAL HARVESTING TRADITIONS, THE COMPANY HAS BUILT UP SOUND EXPERTISE IN EXTRACTING MOLECULES OF INTEREST FOR USE IN AGRICULTURE, NUTRITION AND COSMETICS. AGRIMER PROVIDES THE FULL RANGE OF SKILLS REQUIRED BY THIS SECTOR, FROM HARVESTING TO PRODUCTION AND PACKAGING, AND INCLUDING DRYING, R&D AND FORMULATION.

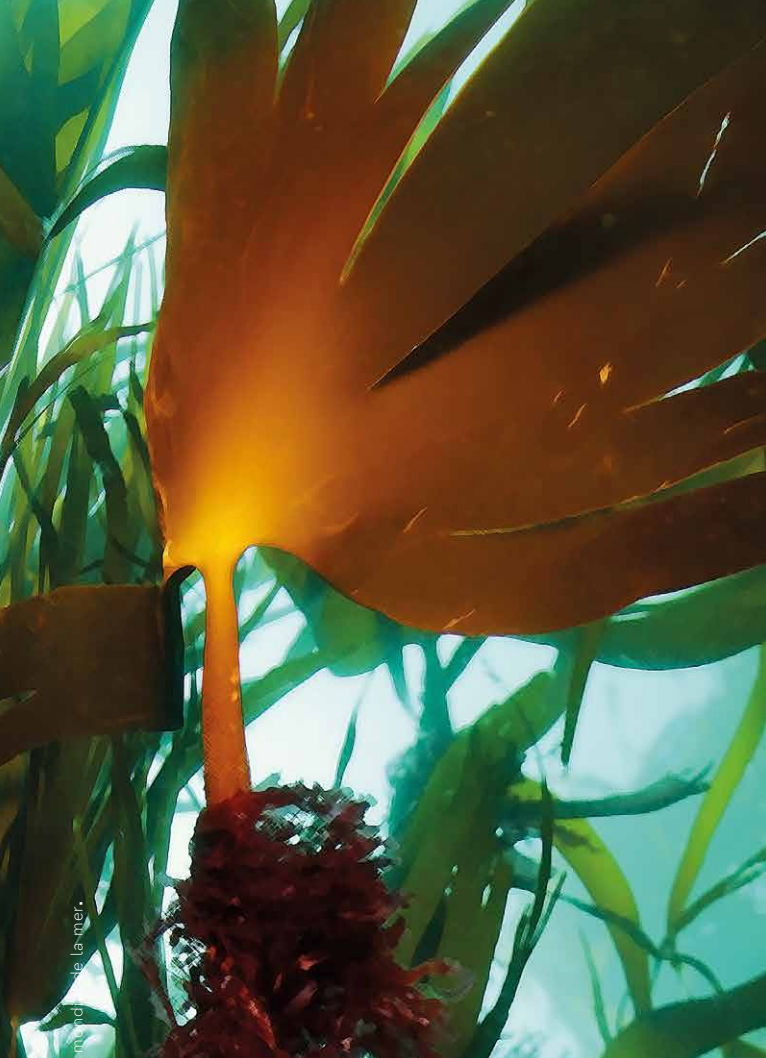
The cosmetics industry has experienced significant growth for over 20 years now, and **Agrimer** has taken its inspiration from molecular cosmetics to perfect 'caviar technology', producing both individual caviar beads and beads in suspension. This product meets the criteria for **Cosmos** certification, which requires 100% of raw materials to be from natural, organic sources and compliance with strict cleaning and production processes.

Marketing manager Laëtitia Tetedoux explains: "*Agrimer's caviar suspension is a marine technology developed using alginate derived from kelp and carrageenan from red seaweed. We designed the equipment ourselves to make these beads.*" She adds: "*Last year Agrimer was awarded the Entreprise du Patrimoine Vivant, or Living Heritage Company label. This mark of recognition from the French State underlines our determination to make the most of this area of national excellence and savoir-faire.*"

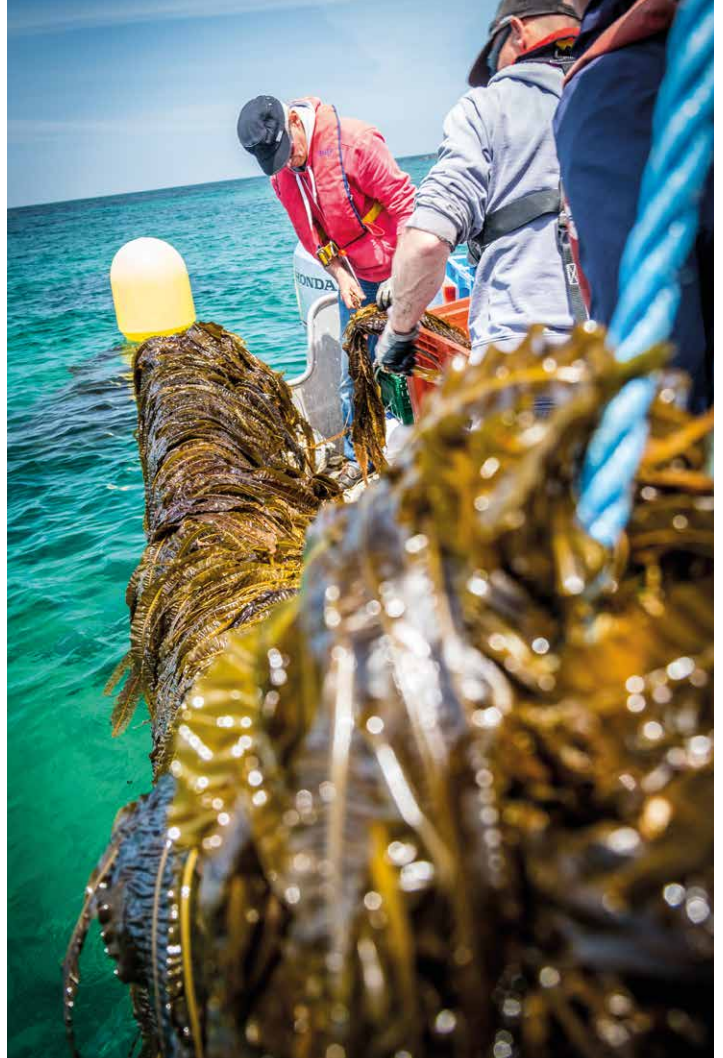


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MANAGING KELP STOCKS

ENSURING THAT KELP HARVESTING FOR COMMERCIAL USE IS SUSTAINABLE INVOLVES A THOROUGH UNDERSTANDING OF KELP AND THE USE OF RESOURCE MANAGEMENT TOOLS. **MARTIAL LAURANS, A RESEARCHER IN FISHERIES ECOLOGY AT IFREMER,** AND **JEHANE PRUDHOMME, FISHING AND FISHERIES RESOURCES OFFICER AT BRITTANY'S REGIONAL FISHERIES COMMITTEE,** EXPLAIN HOW IT WORKS.

WHAT'S THE SIGNIFICANCE OF BRITTANY'S KELP RESOURCES?

MARTIAL LAURANS: Numerous kelp species are found in Brittany, but the two that provide the largest biomass (over 2 megatonnes in total) are *Laminaria digitata* (Ld) and *Laminaria hyperborea* (Lh). These species need moderate temperatures, light and water with relatively low levels of turbidity. They can grow from one metre above the sea level to 5-6 metres below it for Ld and 30 metres below for Lh.

Kelps generate important ecosystems, providing a full habitat. Many different species come and attach themselves to the kelp stipes (stems), while pollock, lobster and abalone may rely on kelp for part of their life cycle. In addition, when kelp is washed away or pulled up from the seabed by the waves, it constitutes nutritious organic matter for other species, forming the lower trophic level in an important food chain.

JEHANE PRUDHOMME: A wide range of studies conducted in particular by the Ifremer, the Concarneau & Roscoff marine stations have enabled us to develop a good understanding of the distribution and population dynamics of Ld and Lh.

In addition, studies analysing the impact of harvesting on the habitat and the associated populations of marine species are starting to provide reassurance - it seems that the management framework put in place by the industry is limiting its impact. For example, a quiet zone was established to limit disruption to bottlenose dolphin populations in the **Iroise natural marine park**, off Brest.

WHAT TOOLS ARE USED IN THE MANAGEMENT OF THIS RESOURCE?

MARTIAL LAURANS: Resource management involves controlling access, whether through the existence of a tightly regulated fleet or by rules governing access in line with kelp growth cycles. Exploitation levels are completely correlated with the balance of the biomass. For decades industrial exploitation concentrated on alginates, but more recently new applications have been developed that allow the algae to be fully utilised.

You have to remember that this is a short supply chain where all those involved have an understanding of the bigger picture. It's a really interdependent 'ecosystem'.



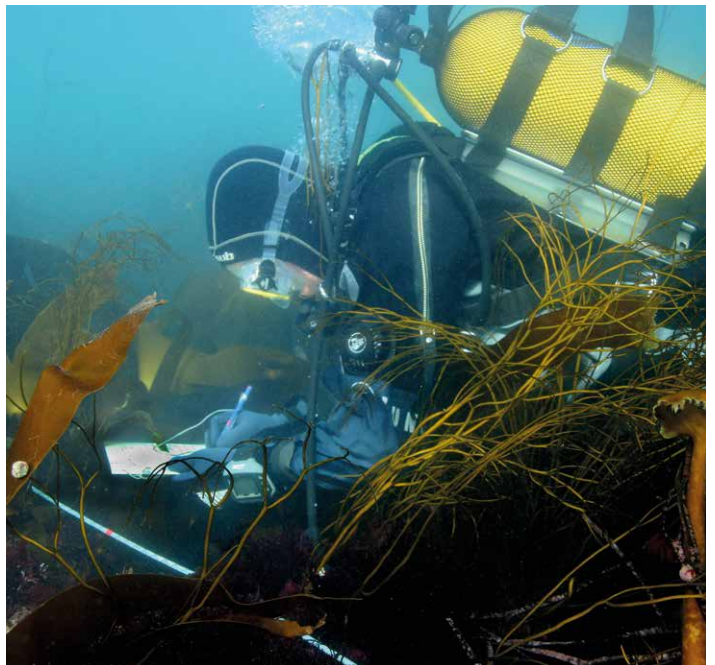
©Station biologique de Roscoff

JEHANE PRUDHOMME: The producers need to be able to ensure and prove that the algae they process come from a sustainably managed source. So all the tools and technical measures that govern kelp harvesting mean they can show that there are harvesting limits (994 tonnes per day for Ld and a system of harvesting strips one nautical mile wide for Lh), open and closed seasons for harvesting, and zoned fishing areas. There are also technical measures that regulate rake dimensions (distance between tines and clearance height to prevent scraping of the seabed) and restrict vessel size to 12 metres. Besides this, vessel geolocalisation technology enables very precise tracking of the spatial distribution of harvesting areas.

Finally, a system of fallow periods for *Laminaria hyperborea* (which grows more slowly) was initiated almost six years ago in response to demand from the industry itself and is proving to be an excellent way of managing stocks.

WHAT ROLE DOES YOUR INSTITUTION PLAY IN MANAGING THIS RESOURCE?

MARTIAL LAURANS: At the beginning of each harvesting season we conduct diagnostic tests to establish the level of biomass and provide



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information to the industry about what they can expect. The daily yield figures from the boats are used to understand the state of the biomass.

Ifremer has a range of partnerships and collaborations with technicians in the field and laboratories at several institutions which provide measurements and modelling. We therefore operate as a 'catalyst' for knowledge and information.

JEHANE PRUDHOMME: Our Committee represents the interests of the Breton fishing industry and membership is mandatory for fishing industry professionals. We are responsible for ensuring sustainable resource management - through the introduction of technical measures and by regulating fishing gear. We also work to promote the positive coexistence of the different entities using the sea.

Regulations are developed through deliberations by the Committee which are subsequently approved by the regional prefect; these then apply to all commercial fishing vessels.



THE ALGAE CLUSTER - COORDINATING THE INDUSTRY

THE ALGAE CLUSTER WAS LAUNCHED IN 2018 BY **THE PAYS DE BREST**¹, **THE TECHNOPÔLE BREST-IROISE** AND THE **BREST CHAMBER OF COMMERCE AND INDUSTRY**. IT WORKS TO ENSURE BETTER COORDINATION AND ECONOMIC DEVELOPMENT OF THE SEAWEED INDUSTRY IN PAYS DE BREST.

"Three quarters of the Breton seaweed industry is based around Pays de Brest", Caroline Peltier, Coordinator of the Algae Cluster points out. "Historically, harvesting took place there and over the years the sector has developed to create an environment that is both focused and also very open."

Outside the meetings organised within the relevant forums (such as trade associations or the fisheries committee) as part of negotiations, it can be difficult for stakeholders to come together and represent the interests of the industry as a whole. The **Cluster** was established with this purpose in mind and working groups have been formed to address a range of needs. *"We spent the first year conducting a comprehensive survey of the stakeholders and setting up the working groups", recalls Caroline Peltier. "During the second year we were able to support a number of research studies and consolidate the structure of the sector, while the third year was focused more on taking stock of the socioeconomic situation within the sector."*

COMMUNICATING WITH A SHARED VOICE

The studies focus on issues such as developing a better understanding of the analytical methods that exist for measuring the toxicological risks from elements and compounds found in algae. *"This sort of work can provide the sector with concrete evidence to justify the argument that regulatory notices don't necessarily correspond to reality in terms of seaweed consumption", Caroline Peltier explains.*

Comprising around 45 companies, scientific bodies, professional organisations and regional and local authorities, the **Cluster** facilitates communication within the sector and helps its members to speak with one voice when it comes to calls to amend legislation.

Following the situational analysis of the socioeconomic realities within the sector, a project was developed to monitor the industry's economic activity and to look at it on a regional scale. This is just one of many projects the **Cluster** could implement. Indeed, after 3 years of existence, the **Algae Cluster** is considering an extension to the regional level.

[1] The Pays de Brest is made up of Brest métropole and 6 other federation of municipalities around Brest.



©Bord à Bord

NEW RULES FOR ORGANIC LABELLING

HENRI COURTOIS, DIRECTOR OF BORD À BORD, REVIEWS THE LAWS ON LABELLING BODIES OF WATER AND EXPLAINS THEIR CONTINUING IMPORTANCE FOR BUSINESSES WISHING TO GO ORGANIC.

Based in Roscoff, **Bord à Bord** aims to popularise edible seaweeds by selling a whole range of processed products labelled as 'organic'. "Seaweed is organic by nature," **Henri Courtois** points out, "It's the environment, the seaweed's natural habitat, that needs to be assessed and certified to confer the right to use the organic label. That label allows companies to access the organic market and thus gives their products added value commercially."

The specifications for organic certification, as laid down by European legislation transposed into French law, currently comprise three elements. First, the environmental quality of the bodies of water involved must be classified as 'high' or 'good'. Secondly, the water quality must be rated A or B, according to the criteria for shellfish waters (in relation to bacteria and the presence of heavy metals). Finally, production must follow the good practice guidelines established by the organic sector. These aim to encourage good resource management by modifying practices in response to assessments in the field and current health information.

Henri Courtois explains: "Assessments are carried out before sites are opened up, and harvesting of a particular seaweed may be delayed if the stock size or density is judged to be inadequate".

EVOLVING REGULATION

From 1 January 2022, in order to be considered organic the harvesting areas will need to have a classification of 'high' for environmental quality or A or B for water quality. This flexibility is appreciated in the seaweed industry.

"The Water Framework Directive is not necessarily the appropriate tool, because just one negative criterion is enough to downgrade the whole body of water to 'moderate' status, whereas a body of water is by definition very diverse." **Henri Courtois** considers that simplifying the rules could encourage new companies to launch, especially in Brittany, "Europe's largest seaweed bed".

INFO + www.bord-a-bord.fr/qu-est-ce-qu-une-algue-bio.html

TRAINING STUDYING SEAWEED AT THE UNIVERSITY OF BREST

STUDYING SEAWEED IS A KEY PART OF THE BIOLOGY SPECIALISM ON THE MARINE AND COASTAL SCIENCES MASTERS COURSE AT **THE UNIVERSITY OF BREST (UBO)** WHERE STUDENTS LEARN FROM ALGAE EXPERTS LIKE VALÉRIE STIGER.

The Marine and Coastal Sciences masters offers eight specialisms, and the study of seaweed features in at least four of these: biology, biotechnology, environmental management and applied economics. **Valérie Stiger** teaches, researches and runs the biology specialism: "I bring the plant kingdom into the mix. Otherwise the focus is mostly on animals." For example, her module looks at seaweed fields and how they develop, especially in the context of warming oceans: in Morbihan *Laminaria digitata* is at risk and is disappearing, but in Finistère it is protected by the Ushant tidal front.

The Population Biology module will focus increasingly on dispersal and recruitment mechanisms, while Ecophysiology will look at environmental parameters that impact on the biological functions



©Sébastien Hervé - UBO

of marine organisms.

Studying chemical adaptation in organisms can lead into the wide and promising field of biomimetics, and the masters course provides many students with a useful introduction to applied research. We belong to the **International Master of Science in Marine Biological Resources** joint master programme which attracts students from all around the world, raising their awareness of Brittany's seaweed sector. As **Valérie Stiger** says, "We study the ocean, which is intrinsically international".

INFO + <https://www-ium.univ-brest.fr/la-formation/masters-smi>



©Safe Seaweed Coalition

SAFE SEAWEED COALITION, A GLOBAL PARTNERSHIP BASED IN ROSCOFF

THE MISSION OF THE SAFE SEAWEED COALITION IS TO ESTABLISH THE BROADEST POSSIBLE ALLIANCE OF STAKEHOLDERS FROM THE SEAWEED INDUSTRY.

"It's a global partnership that includes members such as the **UN Food and Agriculture Organization (FAO)** and **WWF**. It aims to develop seaweed production as a response to the challenge of feeding the world", explains **Philippe Potin**, Research Director at **CNRS, Roscoff Marine Station**, and also **Scientific Director of the Safe Seaweed Coalition**. "The Coalition seeks to show how seaweed can provide solutions to the global food crisis and the climate emergency." He goes on to set out how the development of this sector depends on cultivation and production capacity and that Brittany is at the forefront of this.

MAJOR RESEARCH FOCUS

It is important to have a coalition based here because Brittany boasts

a seaweed industry that is unique in Europe, perhaps even globally. **Philippe Potin** notes that, "At present, 95% of seaweed is cultivated in Asia. But in Brittany we have companies producing and processing seaweed, as well as a significant research sector."

The Coalition, currently funded chiefly by **Lloyds Register Foundation**, will help to establish seaweed projects so that the sector develops in a way that respects the marine environment and workers' safety. Its first global call for proposals was launched this summer and the projects selected will be announced very soon.

INFO + www.safeseaweedcoalition.org

ENGAGING WITH THE PUBLIC



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MANAGED RESPONSIBLY WITHIN A RAPIDLY DEVELOPING SECTOR, SEAWEED AS A RESOURCE IS BECOMING INCREASINGLY POPULAR WITH THE GENERAL PUBLIC. THIS MAKES OUTREACH ALL THE MORE IMPORTANT.

Courses in gathering seafood by hand, cookery workshops, tours of seaweed processing plants - there is no shortage of activities that provide an opportunity to engage with the public. They in turn are ever more interested (and with good reason!) in seaweed and its uses for health and wellbeing.

Established organisations are working to educate the public about fishing traditions and practices, as well as the harvesting and use of seaweed. For example, Lanildut in Finistère, the foremost port in

Europe for landing seaweed (around 35,000 tonnes annually), is also home to a museum dedicated to seaweed. The soon-to-be-renovated **Maison de l'Algue** seeks, in the words of Director **Laura Picart**, "To dispel the myths, especially in relation to the image people have of irresponsible harvesting. We want to explain to the public that this profession is highly regulated and how access to the resource and individual practices are closely monitored".

AN OCEAN OF OPPORTUNITIES

The **Plouguerneau Seaweed Harvesters' Museum** organises lots of activities for a wide range of audiences - individuals, tourists and school groups - with the aim of raising awareness about the existence of this precious resource, the importance of protecting it and the economic opportunities it represents for Brittany, including in terms of jobs. "We're constructing a new building at the port in Plouguerneau, which will provide us with an even better space for outreach activities and will enhance links between the museum and the world outside", says **Caroline Bramoullé**, the museum's Director. Another place worth mentioning is the 70.8 gallery of maritime innovations at the **Ateliers des Capucins** in Brest. Here visitors can find out about the many different uses of seaweed and how various biomolecules are utilised.

INFO + www.ecomusee-plouguerneau.fr
www.70point8.com

INTEGRATED MULTI-TROPHIC AQUACULTURE: A PROMISING MODEL

INTEGRATED MULTI-TROPHIC AQUACULTURE (IMTA) IS SIMILAR TO A TRADITIONAL PRACTICE THAT IS LONG-ESTABLISHED IN ASIA, BUT IT IS A RELATIVELY RECENT ECONOMIC CONCEPT IN THE WEST. **SYLVAIN HUCHETTE, FOUNDING DIRECTOR OF FRANCE HALIOTIS**, WHICH SPECIALISES IN ORMER CULTIVATION IN NORTH FINISTÈRE, EXPLAINS HOW IT WORKS: "DIFFERENT TROPHIC LEVELS ARE COMBINED WITHIN ONE CULTURE SYSTEM WITH THE AIM OF CREATING AN INTEGRATED ECOSYSTEM."

When used in fish farming, IMTA usually involves using seaweed to extract value from waste products: *"The most common food chain in IMTA starts with a plant-based primary producer to which a primary consumer is added (browser or filter-feeder), followed by organisms from a higher trophic level. At France Haliotis, we cultivate local seaweeds and these provide forage for the ormers which thus make use of all the nutrients circulating within the culture system."*

VITAL DIVERSIFICATION

Although the environmental benefits are indisputable, significant differences in the margins that can be achieved for the products of an IMTA system can prove problematic for diversification and even commercialisation.

"The challenge we face currently is to find ways to multiply the trophic levels and add other consumers to the main production system, so we can move away from a highly rationalised monoculture model."

This is the aim of the European **Aquavitaë** project which is exploring the establishment of multi-trophic aquaculture systems.

While ormer/bivalve co-culture (using scallops or flat oysters, for instance) may prove quite complex due to low productivity, interesting solutions are emerging using sea cucumbers which perform a purifying function within the cultivation system.



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INFO + www.francehaliotis.com



©Algolesko

ALGOLESKO - WHERE DEVELOPMENT MEETS ENVIRONMENT

ALGOLESKO IS ONE OF ONLY A FEW SEAWEED GROWERS IN FRANCE AND NOW RANKS AS 'EUROPE'S LARGEST FARM', WITH OVER 330 HECTARES OF HELP. WHAT'S THE SECRET OF ITS SUCCESS? CUTTING-EDGE EXPERTISE COUPLED WITH GREAT PASSION.

Timothée Serraz established **Algolesko** five years ago, and as General Manager heads up an enthusiastic team working in professions that complement one another. He explains *"We're so lucky to have incredible water quality. We've got the whole process covered: we take spores from the natural environment just in front of our offices in Loctudy; we work with a modern hatchery called Aleor near Lézardrieux which we bought in 2019; and we have in-house expertise in marine infrastructure, especially anchoring techniques for maintaining and sizing the seaweed."*

"We do our own R&D for stabilised, fresh and salted, and dehydrated products; and of course we market and distribute our products, which are used in a wide range of sectors including molecules of interest, agrifoods and cosmetics."

Algolesko focuses on growing three types of seaweed: Breton wakame (**Alaria** esculenta), sugar kelp or kombu royal (*Laminaria saccharina*), and wakame (*Undaria pinnatifida*), which was introduced to our climes over 40 years ago. The company has 150 hectares offshore at Lesconil and 180 hectares off Moëlan-sur-Mer. **Timothée Serraz** notes that he takes a necessarily broad approach and describes several environmental projects he has underway, such as smart buoys and data capitalisation over time. *"When you're working to ensure very high-quality, traceable biomass, it's important to add value and conserve it."*

INFO + www.algolesko.com



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FROM QUEBEC TO ROSCOFF

ROBERT LAROCQUE LEFT QUEBEC IN 2012 TO JOIN **ROSCOFF MARINE STATION** AS A RESEARCH ASSISTANT. NOW HE HOPES TO PLAY A ROLE IN BRITTANY'S SEAWEED-SECTOR BOOM BY ESTABLISHING A NEW FIRM.

WE SPOKE TO ROBERT ABOUT HIS LIFE AND WORK. AS A SPECIALIST IN MOLECULAR BIOLOGY, WHAT CAREER PATH DID YOU TAKE AND HOW DID YOU END UP HERE AT ROSCOFF MARINE STATION?

I've dabbled in all sorts of things and didn't follow a traditional route. Although I studied ethology, specialising in ornithology, I began my professional life as a research assistant in molecular biology. In Quebec, it's not so much degrees that count as conviction and motivation.

After moving briefly into microcomputer sales, I returned to molecular biology. I developed a high-throughput method for cloning and purifying proteins for the **National Research Council of Canada** - the equivalent of the **CNRS** in France. After 14 years in public-sector research, I joined the private sector at **Roche Diagnostics**, the Swiss pharmaceutical group. I worked there as a technical adviser responsible for the company hotline and for industrial affairs.

At the time, my plan was to retire quite early to my boat and my wife. But life had other ideas: I lost my 17-year-old daughter in a car accident, and a year later my wife left me. I hit rock bottom.

I felt I needed to move on, so I decided to deploy my international network. Research provides a brilliant opportunity to develop a lot of contacts in other countries. I had the choice of Brazil, France or Germany. My friend **Gurvan Michel**, **Research Director at Roscoff Marine Station**, encouraged me to apply for an engineer position at

CNRS in 2012. The fixed-term contract was renewed and then I took over the **Algolife** project in 2015. This aims to establish a sector for utilising the bioactive molecules from macroalgae in high-value-added human and animal health and nutrition products.

AND TEN YEARS LATER, YOU'RE STILL IN ROSCOFF...

My life is here now! I fell in love - with a woman, but also with this region and its people. I have found challenges and a team which I really like.

WE HEAR YOU'VE GOT AN AMBITIOUS PROJECT IN MIND?

Within the **Algolife** project, we set up a technology transfer laboratory so we could scale up to the pre-industrial production of an enzymatic treatment for algae for the agrifood industry. This lab is in a highly strategic location on the **Laber** site, part of the **Blue Valley** biotechnology park. It's near a student residence, classrooms and various company offices. The idea is to create a real ecosystem around algae: the **Public Investment Bank (BPI France)** has injected €2.1 million in **Roscoff Marine Station** to support this project. But we accept that the laboratory could be used more.

We have resources, the research is there, and there are clear synergies with industry. There's a whole economy here in Brittany to develop marine biotech, and we should be trailblazers! Other countries and provinces (such as Quebec) are already making rapid progress in this area.



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“THERE ARE MANY ECONOMIC OPPORTUNITIES LINKED TO THE SEA AND THE MARITIME SECTOR”

INVOLVED IN THE ORGANIZATION OF THE **OCEAN HACKATHON®** 2021 THAT TOOK PLACE IN NOVEMBER, **CEEI BAHÍA DE CÁDIZ** HAS BEEN WORKING WITH **CAMPUS MONDIAL DE LA MER** SINCE 2013. A GOOD OPPORTUNITY TO LEARN MORE ABOUT THE NON-PROFIT FOUNDATION WITH **ANA SUAREZ**, ITS DEPUTY DIRECTOR.

WHAT IS CEEI CADIZ?

CEEI Bahía de Cádiz is a Spanish business support organization, created in 1997 to promote innovation, entrepreneurship and support business growth and therefore the creation of employment, in the area of the Bay of Cadiz. We are supported by the most relevant private and public socioeconomic organizations from this area and also certified as EUJBC (EU Business Innovation Centre), full member of EBN (the European Business Innovation Centre Network) and full member of ANCES (Spanish Association of Business Innovation Centres). This gives us the opportunity to learn and collaborate with other similar organizations around Europe and beyond. Our activity consists mainly in providing support services, training programmes and incubation services and facilities to entrepreneurs and businesses. We also identify and manage national and EU projects to benefit the creation and growth of innovation and businesses in our area. At the moment we are managing 8 business incubators, located in 6 different municipalities, supporting over 162 businesses, and have plans to keep growing in the following years.

WHAT DOES THE SEA MEAN TO CADIZ?

The province of Cadiz is surrounded by sea, therefore it is an important resource that we need to look after, explore and exploit, in a sustainable way, for the creation of businesses and qualified jobs in the area. There are many economic opportunities linked to the sea and the maritime sector, which provide opportunities to small or very small businesses in the area. Among others: naval and offshore industry or maritime logistics; marine renewable energy; tourism linked to the sea; aquaculture and other activities linked with marine cultivation. We are currently working on a project called "Access2Sea" with other organizations from Brittany (Technopôle

Quimper-Cornouaille and Investir en Finistère), to improve the space planning, social acceptability or business support, to improve the business environment and creation of jobs in the aquaculture sector. Academically, there is an important offer in studies and research programmes linked to marine and maritime knowledge. The national and regional policies and strategies are also supporting the blue economy in the region.

HOW LONG HAVE YOU BEEN WORKING WITH CAMPUS MONDIAL DE LA MER? WHAT KIND OF RELATIONSHIP DO YOU ENTERTAIN WITH IT?

We had a very good experience working with **Campus mondial de la mer** on the EU Project "Atlantic Blue Tech" between 2013 and 2015. This was the beginning of a long-lasting relationship. We have organized an edition of **Ocean Hackathon®** in Cádiz in 2020 and were involved in a new edition in 2021. Recently we have also organized with its support a business mission to Brest, where a group of Spanish start-ups linked to the blue economy sector had the opportunity to learn from different organizations involved in the maritime ecosystem from Brittany and to explore other opportunities available in the region for this sector. We also had the chance to attend the **Sea Tech Week®** event in previous editions. We see that the way things are organized in Brittany to maintain such an important and compact ecosystem around the sea, could be an example for many cities and regions around Europe, and I would really recommend a visit to learn from it.

THE MÉTÉO-FRANCE MARINE AND OFFSHORE CENTRE IN BREST

THE BREST MARINE AND OFFSHORE CENTRE RUN BY MÉTÉO-FRANCE SPECIALISES IN TAILORED SUPPORT FOR CLIENTS WITH OFFSHORE INTERESTS. ITS EXPERTISE ALSO BENEFITS PORTS AND LOCAL COMMUNITIES.

Until the end of 2020, the meteorological work of the **Brest Marine and Offshore Centre**, located in Guipavas near the airport, focused on three areas: aviation forecasts, a land-based service (for the safety of people and property in Finistère and Morbihan) and a marine service. The forecasts consisted of regular weather reports, plus alerts as needed.

"Last year we realigned the Centre's work to focus primarily on the maritime sector", explains Director **Michel Aïdonidis**. "We provide services and support tailored to the needs of different clients, from institutions to maritime and offshore industries, including oil platforms and marine renewable energy companies such as wind farms."

FROM BEACHES TO RAILWAYS

With a team of around a dozen forecasters, the Centre operates 24 hours a day, seven days a week, providing a range of products to suit its clients and covering a geographical range from the coast to the offshore zone and the open sea. The Centre serves coastal communities, beaches and areas likely to suffer with coastal flooding but also provides services to ports – such as for the piloting of large vessels or for the transportation of gas, for example to Corsica. The Centre even supports the French railway company, SNCF, which has around ten sections of track that run very close to the shoreline.



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In the open sea, the Centre works for international sites, such as oil platforms in the sea off Guinea and Angola, a port construction project in Morocco and, more recently, for Monaco's land reclamation project.

ALERT THRESHOLDS

Michel Aïdonidis describes how the Centre has to adapt to each client's requirements: "For example, they may set thresholds for particular maritime operations and we need to know these so that we can activate alerts appropriately. We can also suggest modifications to these thresholds, if necessary, based on our experience or on internal analyses."

Météo-France has been operating an atmospheric monitoring and ocean weather forecasting centre at Brest-Guipavas airport for several decades. Mostly, the Centre issues short-range, deterministic forecasts, covering a period of up to four or five days, but long-range probabilistic forecasts for up to 14 days are also provided.



3rd Assembly of the Campus mondial de la mer

16 December 2021 in Brest, France

The 3rd Assembly of the **Campus mondial de la mer** will be the occasion to present the roadmap of the Campus for the next 3 years through concrete examples for the community. These exchanges will be punctuated by the pitches of the **Ocean Hackathon**® winners, whose final will have taken place the day before.

More information on www.campusmer.fr



Oceanology International

15-17 March 2022 in London, the UK

Oceanology International brings together 500+ exhibitors in the only event that links the three key players in the industry: businesses, academics and government. With over 8,000 attendees targeted for 2022, it is a must-attend event for those involved in exploring, monitoring, developing or protecting the world's oceans.

More information on www.oceanologyinternational.com

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